Industrial Finishing

An Independent Publication Devoted To The Finishing of Industrial Products

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With the Editor

FORECASTING COLOR trends today is a subject of vital interest to all manufacturers using industrial finishes—manufacturers of furniture, automobiles, sporting goods, novelties. toys, etc. For the first time, manufacturers in many lines are faced with the necessity for a decision as to the relative appeal of individual colors and shades from the standpoint of the consuming public. In this connection it is interesting to note some of the points brought out by Mr. Ward Cheney of Cheney Bros., silk goods manufacturers and wholesalers, in an article in May issue of the *Executive Service Bulletin.*

Mr. Cheney points out that the new and novel color schemes generally originate in influential centers of fashion and art, as for example, with dress it is Paris. These influences direct the trend, but, he declares, they constitute only about 30 percent in volume of sales at any given time. About 40 percent of the volume in sales is accounted for by the remarkably dependable and constant demand for staple colors—those used regularly year after year. The remaining 30 percent is neither novel nor strictly staple, but is designated as semi-staple, its origin lying in the novelties of former seasons.

The percentages are based upon years of study of the buying habits of America's millions and it may be assumed that they are reasonably accurate.

Mr. Cheney further explains that an analysis of the trend of color—a color index compiled weekly, and published monthly—shows the relative popularity of various color families, the relative movement of novelties and staples and the individual importance of the leading novelty colors, this information all being based on current sales.

In conclusion he declares that: "The time has gone by when a merchant wants to carry all the stock that any stray customer may want. It is too expensive . . . Inventory of infinite variety surely implies a high degree of obsolescence and sacrifice . . . Colors cannot be copyrighted, but the fact does not make it any less necessary to have the right colors. Clean stocks and active turnover are the rules of the new game of production and merchandising."

W. H. Rohr

Managing Editor

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For Management to think about and act upon.

Much Unnecessary Wastage --- How to Find it; How to Stop it

Senior Member of The National Accounting Systems explains how to find numerous sources of wastage in industrial finishing departments, points out what causes and conditions are responsible, and details practical plans and methods for permanently eliminating them

By J. J. Berliner, B.C.S.

WASTE in the factory is attributable to:

1—Low production caused by faulty management of materials, plant, equipment and men.

2—Interrupted production, resulting from idle men, idle materials, idle plants, idle equipment.

3—Restricted production intentionally caused by owners, management or labor.

4—Lost production caused by ill health, physical defects and industrial accidents.

In a majority of factories, unnecessary waste can be attributed to inefficient management. In the factory executive's hands lies the power of saving thousands of dollars by controlling all unnecessary waste. He can handle his organization so that points of waste and spoilage in the plant are sought out systematically and checked carefully.

Sometimes it happens that insignificant losses are followed closely while the larger ones are almost entirely overlooked. In order to determine where the most important losses lie, the factory executive should know the relative proportions of raw materials, labor, etc.

Faulty Material Control

In a great many factories, lack of control of material results in a serious drain on production through the waste of material. Lack of control may also be felt in many directions. One factory for example, that had no proper control of defective processed material, found that the cost system broke down at inventory time. All extra material drawn constituted a leakage and practically all re-work was paid for as though it were new work.

The cost summaries did not include the abnormal losses, and the time-keeping department had no means of separating repairs from work on permanent improvements. Hence they were merely charged into productive labor. This time and material, therefore was omitted from the costs, as it was neither part of the direct estimate nor included in the non-productive labor applied through the overhead burden. A flat ten percent was then added to the value of all material to cover the loss, which was not an accurate way to include it in the costs because one kind of material had more waste than another.

Control of Material Consumption

Another source of waste is defective control of material consumption. For executive control of the consumption of material, the material specifications for each item manufactured should be developed by tests. If these material specifications are in the hands of the stockkeepers as well as the foreman, the amounts of any material withdrawn can be posted on the specifications.

The allowances, fixed in advance, should not be exceeded without management at once knowing what has occurred and why, which enables an executive to fix the responsibility and prevent the recurrence of such loss. At the same time the management may determine an approximation of the volume of departmental output and fix authorizations for the allowable limits on the supplies, as well as other expenses.

Within the limits of an order, the actual material used on that order, in comparison with the output of good pieces, will give a unit cost for the material used that will include the waste produced. If the necessary net amount of materials is known, then a comparison between that and the actual amount used would equal the waste which is subject to economizing.

Recording Quantities Daily

One of the simplest methods of controlling waste is to record and compare the quantities used from day to day or from period to period and, after obtaining the best performances for standards, to eliminate any fluctuations from those standards.

On machine operations the waste may run from one to five percent, so that it is rare not to find a shrinkage of at least three percent of all material passing through the machine departments. The saving in labor and expense by eliminating this waste might easily run into thousands of dollars annually.

The present loss of many concerns is not limited to the original cost of raw material, but carries with it the labor and expense already expended in receiving, sorting or grading, storing, and working up to the point where the the defect is discovered and waste is created. So here are opportunities for keen analysis by the factory executive.

After ascertaining the finishing materials necessary for different items by accurate test, materials should be disbursed according to the absolute standard requirements for individual cases. Take an example by way of illustration: In dipping operations the distance from the top edge of the tank to the surface should be measured before and after each separate run.

Such watchful care of the valuable materials will reduce their usage to a reasonable figure, because when uncontrolled by reference to adopted standards, the present consumption of materials that must have some waste is sure to be considerably out of proportion to the operating waste standards that are possible in the average factory.

Where Wastage Occurs

If the total supplies used in a department should treble in a month, it would mean something to the manager who would at once order a complete analysis. But if one article's usage trebled in a month and other articles were used in less amounts, the management would know noth-

ing about it unless a perpetual supply analysis were kept. Lists should be issued, giving the articles that are to be returned when worn out and exchanged for new ones. Only the factory executive should authorize and approve any requisitions for such articles when the foreman does not have old ones to return.

Continual analysis will effectively reflect carelessness in leaving barrels of oil, etc., without shutting off the cocks, the shrinkage of material through the use of leaky containers—or through the lack of protection given the material—the waste of such articles as soap by thoughtless men, the accidental breakage of glass instruments, electric-light bulbs, etc. All of these items are of small account when considered individually, but their aggregate value over a period of time runs into large sums of money.

Corrective Influence

These apparently trivial expenses should be checked, as they might become large leaks in the end, because their continuance without supervision allows the development of all the habits of carelessness, shiftlessness and dishonesty in workmen. Furthermore, large losses will never be detected unless a thorough system of catching even the small losses is adopted.

This system should be especially proof against dishonesty and should thereby remove all temptation from employes. A delivery system with a re-checking of the orders and receipts for packages signed by the customer will be a large factor operating to deter drivers from diverting goods from their proper destination.

(To be continued)

Colors at Airplane Show

Lights flashed on in the big Jefferson street armory at Syracuse, N. Y., on April 30th at 7:30 p.m., when Mayor Charles Hanna, in his office five blocks away, passed his hand over an orange-glowing tube on his desk to usher in the New York State Aircraft Exposition, the first of its kind to be held in the East.

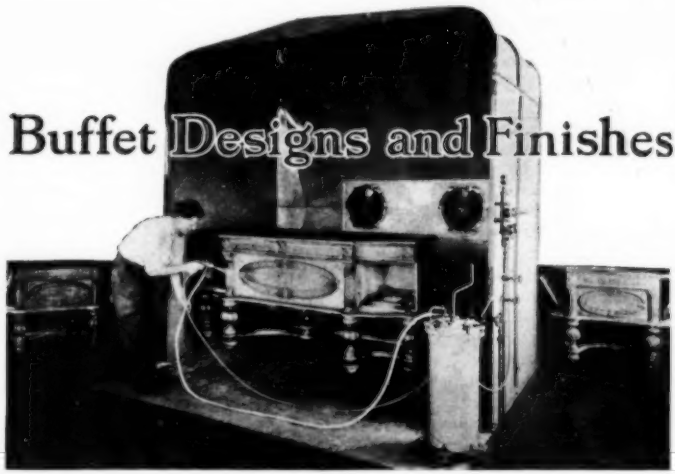
Planes of all kinds, like many colored dragon flies poised for flight, were scattered over the floor of the big drill hall. They ranged all the way from the great orange and green Stinson-Detroiter—the most beautiful and spacious plane at the show—to the tiny motorcycle-engined one-seater from Oneida, N. Y., looking for all the world like the diminutive planes in which Mutt and Jeff travel in the comic strips.

Here in a variety of colors, depicting the advance in the use of colors as related to the airplane, were giant passenger ships, tiny scout planes, mail and commercial planes. The exhibit was purely an educational one, sponsored by the Syracuse chapter of the National Aeronautics Association, whose purpose it is to teach the public more about the airplane, the fliers and the industry in general.—A. J. Owen.

Exports of 1,000,000 vehicles per year by 1930 can be expected if the present favorable factors continue, according to the statement of one large manufacturer.

Wholesale change-overs of old plants cannot be made without financial preparation. And here we come to a question: "Are we sufficiently discounting present possibilities of obsolescence in making financial plans?"

Buffet Designs and Finishes



Consulting designer reviews the development of buffet designs and finishes, calls attention to the woods and finishes used for period designs and reveals what is characteristically modern in this line

By Leo A. Jiranek

THAT piece of furniture commonly known as a "buffet" has passed through many stages and has been called by many different names before it developed into its present form.

Looking back on the various periods, we can observe the development of this article of furniture. It is seen in the small colorful serving tables of the Gothic period and in the heavy and beautifully-carved sideboards and chests of drawers of the Renaissance. The former were elaborately painted and gilded, while the latter had a natural finish.

Period Designs

In the Empire Period there was a piece of furniture closely resembling our modern buffet in construction, which had a marble top and metal ornaments. So many coats of varnish were applied to these pieces that the grain of the wood was lost, and the whole effect of the piece was more like its marble top than like wood.

Cupboards of oak, with a simple wax finish or sometimes no finish at all, were prevalent in the Elizabethan and Jacobean dining rooms.

Chippendale, Adams, Hepplewhite and Sheraton used mahogany almost exclusively in the furniture they designed, and their sideboards varied in finish from one of rich, dark mahogany with inlays of satin, rose, hare and other rare woods, to one of much gilding and painting. This group of designers was the first to put the sideboard into anything like

its present day form, and Sheraton was the one who perfected it.

The Colonial sideboard was a beautiful creation, the native woods such as maple, oak, hickory, pine and gum being used; also native black walnut which was of a lovely color. Mahogany was imported and was also used in some of the Colonial furniture. On these sideboards the surfaces were plain with very little decoration, thus the beauty of the wood was brought out.

Modern Designs

Today, of course, we have nearly all of these various types of sideboards and buffets, which are used intermittently in the modern home. The large, heavy, massive buffet—with its many carvings, overlays, inlays and contrasting veneers—is very popular. The greater part of this modern buffet is generally composed of walnut, the best finish now being a light one, bringing out the natural color of the walnut and showing off the beauty of the wood grain.

The carvings and turnings are all well high-lighted, and little or no shading is used. The fancy veneers, which are used in combination with the walnut, are usually worked out with some finish that will harmonize with the base color and still have a nice contrast.

A small oak buffet for dinette suite, finished to show oak grain but tinted to give color, and stencil-decorated with small and simple color designs centered in doors and in corners of the top.

In Dinette Suites

Apartments and small houses have furnished an incentive for the creation of the dinette suites or small dining room suites which are made in proportion to the size of the dining room. The small buffets which go with the dinette suites are constructed on very much the same lines as the larger ones, but they are not as heavy looking and are more simple. They have about the same finish, the tendency being in the present day to lean toward the lighter, more natural color of the wood. In this type of buffet the same wood contrasts are used between the veneers, and again no shading is used in the finishing except to obtain the right high-lighting effects on the turnings and carvings.

Small buffet in high-lighted color enamel, with decalcomania decoration centered in front.

Buffet of Art Moderne

Art Moderne has an entirely new type of a buffet, based on plain, straight lines and geometrical figures, and in the finish, one is attracted by the various woods that are used, all showing off a different grain or color. In this modern furniture, silver leaf and gold are

used to a great extent in combinations with other colors. But for the most part, in the more attractive of modern furniture, the effect gained by finishing depends largely upon the natural woods used in its composition.

For Better Results With Varnish and Lacquer

Varnish is, after all, a perishable material and will not last forever. In this respect it does not differ from everything else except, perhaps, in point of time.

This has been officially recognized by the piano industry and, under the date of Feb. 27, 1895, manufacturers sent out a four-page circular letter in which they placed this "unvarnished" truth before the dealers in their products. The enemies of a piano finish—high and low temperature, moist and dry atmosphere—are constantly at work, and to them it finally succumbs through its inability to withstand the radical changes it is thereby subjected to.

The process of decay can be accelerated by the method of application used, and by an improper surface. Too heavy a coat, applying one coat on top of another that has not reached the proper stage of hardness, or applying the finish on thin glue-soaked veneer—any one of these will positively cause checking and cracking.

While the question of price has always been important, manufacturers of high-grade goods have been more or less willing to pay a fair price, but they have insisted upon rapid-drying materials that would enable them to rush the work through the finishing room as speedily as possible; this in spite of protestations of the varnish maker who knew that the slower-drying (long-oil) varnish would withstand the onslaught of its enemies a longer period of time.

Lacquer has therefore appealed to the various industries on account of its rapid-drying properties, and is being quite universally used; but we still have much to learn about it and some serious short-comings to overcome.

We have, however, learned that the lacquer requiring about six hours for proper hardening throughout, will cause less trouble and produce more lasting results than those that dry more rapidly. —M. H. Johnson.

Finishing Pumps and Tanks

I have had good success with the following schedule for finishing gasoline pumps and tanks:

1—Spray coat of metal primer. Air dry 24 hours.
2—Spray coat of metal enamel. Air dry 24 hours.
3—Spray coat of Spar varnish.

This schedule could be applied successfully in finishing other articles of similar character.—J. Cowan.

One of the problems of spray gun operation in lacquer or other types of finishing has always been the elimination of moisture, oil, and refuse from the air line, or air hose connecting the gun with the compressed-air installation.

With Alexander Milburn Co.

Mr. B. R. Sausen has become associated with the Alexander Milburn Co. of Baltimore, to take charge of their paint spray equipment department.

Mr. Sausen, a graduate mechanical engineer of the University of Minnesota, gained his mechanical experience with the Westinghouse Electric & Mfg. Co., and in 1918 became identified with the Binks Co. in the designing and development of spray equipment.

Modern Automobile Lacquers

Much information about pyroxylin lacquers for automobile painting is revealed in this, the first part of a DuPont chemist's paper presented at the annual meeting of the S. A. E.

By Dr. G. C. Given

PYROXYLIN lacquers were first used on a production basis on automobiles in 1923. At the present time they can be said to be completely established in this field. Their great durability, and the enormous range of available shades and bright colors have caused them to be adopted as the finish for automobiles in practically all countries in the world.

The adaptation of pyroxylin lacquers to automobile finishing was brought about by the discovery of a method of producing these products in a highly concentrated form of low viscosity, without impairing the film strength.

This discovery permitted the manufacture of a lacquer of sufficient high pyroxylin content to give durability without excessive costs. The older lacquers, because of their low concentration, required three or four coats to give as much protection as one coat of the present-day material.

Before going into a discussion of composition and uses of lacquers, it may be well to define a few of the technical terms used:

Lacquer Materials

Pyroxylin is a cellulose-nitrate, made by subjecting purified cotton to the action of acids, under carefully controlled conditions of time, temperature, ratios, and concentrations. The treated product is washed free from adhering acids, boiled for hours with many changes of water, and the water finally washed out with alcohol. As alcohol is a valuable ingredient in the finished lacquer, that remaining in the pyroxylin is not removed.

Plasticizer is a general term used to cover a number of substances which will mix readily with pyroxylin, forming a homogeneous plastic, and which, moreover, are of such low volatility that they will not evaporate from the pyroxylin under ordinary conditions. Some plasticizers are actually solvents; others are not. (Examples — tricresyl phosphate and dibutyl phthalate.)

Resin (somtimes called gum) is also a general term used to classify a number of substances, both natural and synthetic, which have the appearance and properties of a resin. (Examples—shellac, ester gum, etc.)

Pigment is the colored powder used to impart color to the clear pyroxylin vehicle. (Examples—zinc oxide, chrome yellow, lamp black, etc.)

Solvent is a general term used to designate a substance which will dissolve pyroxylin. (Examples—butyl acetate, amyl acetate, acetone, ethyl acetate, etc.)

Non-solvent, or diluents, are general terms used to classify a number of liquids which, although they will not dissolve pyroxylin, may be mixed with a liquid of the "solvent" type in certain proportions without destroying its solvent power. These materials do not function solely as diluents They influence the drying qualities, and gloss, and are otherwise needed to maintain compatibility

between the pyroxylin and the resin. (Examples—gasoline, toluene, butyl alcohol, etc.)

The modern lacquer therefore consists of a solution of pyroxylin, plasticizer and resin, into which a suitable pigment or combination of pigments has been ground. The material used to dissolve these ingredients is a mixture of "solvent" and "non-solvent" in proper ratio.

When a lacquer dries, the solvents and non-solvents simply evaporate, leaving a film consisting of the solid ingredients. In the older, oil-type paint and varnish finishes the mechanism of drying is quite different. Here the oil takes up oxygen slowly from the air, and is thereby changed from a liquid to a solid. It is, therefore, said that a lacquer dries by evaporation, and a paint by oxidation.

Durability

To be considered durable, a finish should not change color; it should not crack or craze; it should not check (take on the appearance of an alligator's skin); it should not peel; it should not scratch readily; and it should protect the underlying surface from the action of the elements.

These qualities of durability are all influenced by the composition of the lacquer. For example, too low a ratio of pyroxylin to other clear ingredients will produce a finish which will either craze or check. On the other hand, too high a ratio of pyroxylin will impair the adhesion. The pigment used in a lacquer has also a very great influence on the durability.

Even with properly balanced clear ingredients, if the pigment is of the incorrect type, the finish will fail in a very short time. A notable example of this type of failure occurs in the case of some of the deep wine-colored maroons. Some pigments used to obtain this shade are simply not suited for lacquer manufacture, even though they may have been suitable for the older oleo-resinous finishes.

The proportion of pigment as compared with the non-pigment solids also has a very marked effect on the durability. If the content be too high, cracking is liable to take place, and if this does not happen the chalking will be excessive.

(To be continued)

Smoothing, Finishing and Polishing by Tumbling

In the smoothing, finishing and polishing of small articles, the tumbling barrel can be used to good advantage. Reference, of course, is made especially to wooden articles that require a finishing coat of lacquer material—such articles, for example, as golf tees, toy parts, spindles and in fact anything up to 6 or 8-in. in length. The tumbling barrel can be used as a preliminary smoothing operation, an actual coating operation, or as a finishing-off or polishing operation.

In the case of wood turnings that may have cross-grain and raised "nibs" or "fuzz," half an hour or an hour in a tumbling barrel, with wood shavings or portions of used sandpaper, will present them in condition ready to receive lacquer coatings—the turnings then having the appearance of having been sanded by hand.

In the actual "coating with finish" operation, the type of tumbling barrel that might be used is one of solid structure. By "solid structure" is meant that there are

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no openings, the tumbling barrel representing in all respects a true wooden barrel. Articles are placed in the barrel and the minimum amount of lacquer is poured over them. The barrel is set to revolving and the action of the articles turning and rolling in the course of each revolutiou causes them to be completely coated.

Still another means of coating small articles consists of using an ordinary washing machine of the "Laundryette" type. Lacquer material, reduced to proper consistency, is placed in the bottom section of the machine; the articles to be coated are placed in the wringer section, which is then immersed in the lacquer.

A wooden paddle is used to insure proper coverage of the surfaces by lacquer material. The wringer section is withdrawn by a pedal attachment, the section being raised to the proper height so the lacquer will drain back into the lacquer chamber. The wringer section is then set to revolving by power and the finished surfaces are dried by centrifugal force.

In the case of small wooden articles made of hardwood, a tumbling barrel can be used to good advantage as a finishing and polishing medium, by placing a vegetable wax in the tumbling barrel. The revolving of the barrel and the contact between the wood surfaces and the wax produces clear, polished surfaces bringing out the natural wood grain and making a very pleasing and economical finish.

In some respects the results obtained by tumbling with wax are comparable to a sprayed nitrocellulose lacquer finish that has been polished and waxed.

Another use for the "finishing by tumbling" method is to polish lacquer-finished wood articles. Place the objects in the tumbler (the articles having first been coated with lacquer and thoroughly dried) and add wood shavings or old newspaper strips; then set the tumbler to revolving. At the expiration of about a half an hour, the coated surfaces have the appearance of having been hand polished.—M. C. Roberts.

In lacquers to be used on cheap brass goods, a dye is generally added so that the lacquer film adds to the rich appearance of the article, causing it to appear to contain more copper than it actually does.

An essential feature of a brushing lacquer to be sold to the householder is its non-lifting action on old varnish. It must not affect old paint or varnishes that are already on the surfaces to which it is to be applied.

Generally speaking, spraying lacquers have a higher content of cotton, and brushing lacquers have a higher content of gum, making the former harder and tougher and the latter more body gloss but not as great durability.

A Color Scheme for Every Room

This is the title of an interesting and colorful booklet of 24-pages, being distributed by E. I. DuPont De Nemours & Co. Inc. The authors of the several sections—six prominent interior decorators—set forth the principles involved and tell how to apply them in decorating a particular room. Complete details of color schemes are offered for the living room, bedroom, dining room, kitchen, nursery and porch.

This booklet is being distributed in conjunction with the activities of the Du Pont Home Decoration Service, which is carrying on extensive educational work along artistic lines; and is working in co-operation with 50 Duco decorators who are touring the country, giving talks on home decoration in schools and stores, and before women's clubs and other organizations.

Pee Gee

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Color Psychology—An Important Factor in Furniture Sales

Consultant on merchandising reveals conclusions drawn from observation and investigation of the trend in retail furniture buying and offers some interesting and timely suggestions to furniture manufacturers, designers and finishers

By E. J. Clary

FURNITURE designers and manufacturers are largely interested in the technical phases of their craft and while they must always have the ultimate buyer in mind, the hard-boiled psychology of the furniture sales floor doesn't come as closely to them as it might.

It is on the floor that the retail salesman gets directly the reactions of Mr. and Mrs. Brown and Mr. and Mrs. Jones. The retail furniture salesman may, but usually does not, understand the finer technique of furniture finishing and coloring; however, he has his own ideas on the subject and they are of sufficient importance to get the ear of the factory.

In 20 years frequent contact with retail furniture salesmen and after working closely with scores of them, I have come to the conclusion that the craftmanship phase of furniture is little understood by the average salesman and he puts too little stock in it for his own good. He realizes that the average furniture customer knows very little about wood finishes and other manifestations of craftsmanship, but that this same average customer knows what he or she likes. It is with that, in the final analysis, that the retailer and his floor men are most concerned.

Reference here is made to the average run of furniture and not to the shops stocking the finer grades of period stuff.

Color, in the belief of the floor man, is first in importance in 90 percent of the goods being sold on the floor today. In the case of certain articles of furniture, color seems to take precedence in the mind of the prospective consumer over design and even finish. This is perhaps due to the fact that never did color play so important a role in interior decoration as it does today, and the awakening of the people of small means to the possibilities of color in the home.

How Color Furniture Sells

This is strikingly proved in the case of painted furniture numbers. One of the leading furniture buyers of New York said:

"Nine out of ten of the people who come to our floor to see painted furniture specify color in the first breath. If we carried in stock all the colors of the rainbow, we would still have trouble filling many orders. Nearly every customer buying painted pieces wants to match something—cretonne, velvet, chintz, silk, etc. A large percentage carry samples of this and that and pull them out for the salesman to match. This indicates a color consciousness on the part of the furniture buying masses—the world in which we do business."

Those buyers who understand nothing of design and are unappreciative of finish, will always be at home when it comes to consid-

ering color. Perhaps the greatest number of buyers of cheap furniture in this country today, purchase purely upon the basis of color because color is a thing that is tangible, recognizable, established in the most ignorant mind. It is not unusual to hear obviously uninformed people on furniture aisle floors quibbling over the different shades of mahogany or maple. These same people do not know a Jacobean piece from a Chippendale!

The informed furniture buyer approaches her purchase from more than one angle:

1—Finish	2—Wood
3—Design	4—Utility
5—Color	6—Demand

But the masses who buy the cheaper grades of furniture fall back on color—and possible comfort.

In Department Stores

Take the case of nursery sets: Department stores are probably compelled to handle more special finish jobs in this line than any other. The New York stores stock four or five colors on leading numbers, but the demands for other colors is so great that what they have serves merely as samples of design.

It is much the same with willow and reed. Here color is the ruling factor, at least in the cheaper grades. So true is this that many dealers are stocking only unpainted pieces, relying upon special painting orders for their sales.

To get back to the retail salesman and his problems, he knows that in the cheaper price ranges, his customers will, in the main, give the greatest consideration to color and will display unusual knowledge of color combinations, when they are ignorant of all other points of appraisal. He knows that he cannot often fool such a customer in the matter of color and he doesn't try because he knows there will be a kickback. As soon as Mrs. Jones and Mrs. Brown get their sun parlor sets out home and up against the cretonne or on the rug, the error, like the chicken, will come home to roost.

The retailer and buyer, as a rule, seem to feel that the factories could well afford to furnish wider color ranges in painted numbers and particularly in:

1—Nursery sets	2—Kitchen stuff
3—Willow and reed	4—Side pieces

Of course, the manufacturer has his own problems in the matter. He cannot afford to warehouse so much stuff. The wider the color range on painted stuff, the bigger the factory stock must be and the slower the turnover. This is reasonable enough, but the retailer cannot always see it.

Narrower Range of Color?

One course has been left open to the dealer, and the larger department stores are taking advantage of it. An organized effort is being made by the furniture buyers and merchandise men in the larger stores in the East to educate buyers of less expensive painted furniture to a narrower range of color.

A good selection of neutral shades will meet the requirements of any prospective buyer short of a crank. Whether the run of furniture dealers and salesmen will make any such organized endeavor, is another question. But the department stores are aware of the foibles of the masses when it comes to drawing fine lines in color. It is purely and simply a question of floor selling.

Add Enamels and Brushes

One buyer in Boston made the remark recently that they had reduced their special color orders by half through displaying a line of enamels and brushes by which the customer might refinish the job at home. It is probable that the cranks might be easily satisfied by such a move and the store would be less likely to lose a sale. The factory, in turn, would be saved an unprofitable painting job. What the customer might get depends upon his or her cleverness with the brush and the amount of patience exercised in execution.

Clean Spray Booths

To put spray booths in condition for easy cleaning, coat the interior of the booth with ordinary motor oil at the beginning of each week. Then, at the end of the week, you can easily scrape off the accumulated lacquer from the interior with a wide putty knife. This leaves a clean booth over Sunday.—Joseph Cowan.

Note by Editor.—There are also regular spray-booth coatings available for this purpose and, according to reports from practical men, some of these prepared coatings give excellent results.

Sanding Before Finishing

When a wood surface has been leveled off and all the holes have been filled, it is ready for final smoothing. This usually is the part of the finishing process where the work of an apprentice or novice, quickly becomes apparent. One just learning the trade is ordinarily too eager to complete his work; he hurries through the sanding with the thought in mind that this will have little if any effect on the final result.

The final appearance of a finished wood surface depends, to a great extent, upon the care and skill with which sanding is done. If it is done carelessly, no amount of skill in applying the stain or varnish will bring about satisfactory results. Unless the surface is as smooth as it is possible to make it, the rougher portions will absorb more filler and stain than the smoother parts and, as a consequence, will show darker. No amount of shading or color matching will make the finished job as satisfactory as it would have been if the surface had been properly smoothed in time.

If, when sanding, the workman rubs across the grain of wood, the sandpaper will cut fine lines (scratches) which may not show until the final filler or stain is applied; they will be sure to show up during some part of the work. The workman must be careful, too, that he does not round off the corners. An apprentice is quite apt to do this sooner or later and, once it has been done, the dubbed-off members cannot be readily restored.—John A. Twamley.

There are numerous technical details connected with the air-compressor unit and the air line which require very careful planning and which should be handled in connection with the engineering service employed.

An important consideration, when installing compressor facilities, is that of long life and continuous service with the minimum inconvenience and fewest breaks in operation.

Ace High/

PERHAPS it is only natural to think of the Rockford Varnish Company as just another maker of lacquer.

Yet we believe no other manufacturer watches the processing of each batch with so many meticulous tests and analyses. There is just one quality that passes final inspection—it *must* be "Ace High."

We are getting new customers steadily —and keeping the old ones. That makes us believe it pays to be "fuss budgets." Your product is worthy of the best lacquer you can buy.

"No tampering with Quality"

The
ROCKFORD VARNISH
Company
ROCKFORD, ILL.

Furniture Decoration in Colors by Silk Screen Stencils

President of Artsign Co., Indianapolis, Ind., explains new low-cost method of color decoration which is readily adaptable to short orders or volume production jobs in various manufacturing industries

By Frank S. Chance

THE USE of silk-screen stencils for decorating finished articles has, in the past five years, made rapid strides. What is known as the silk-screen process was primarily used for the making of window-display cards for national advertisers. By this process pictorial effects can be obtained that are so nearly akin to hand painting that even experts are sometimes deceived.

Makers of tire covers use the silk screen process because it is almost impossible to make printer's ink stick to the highly-finished fabric. Paper or metal stencils could be used but, because of the necessary "stays," the finished work is unsightly.

Now that decorated furniture is so popular, many manufacturers are in a quandary as to what method is best adapted to their particular needs. It is the purpose of this article to explain in detail the possibilities of the silk screen as a means of applying art subjects to any piece of furniture, ranging from an inexpensive novelty piece to an elaborate bed room suite.

Making the Stencil

The make-up of a silk screen stencil is simple. It consists of a wood frame to which is tacked a piece of bolting cloth—a finely-woven silk of exceptional strength. The design, whether pictorial or plain lettering, is traced on the silk and those parts of the stencil that are not to be printed are filled with a specially-prepared lacquer which is not affected by oil paint or gasoline. The open meshes of the silk make the design.

The stencil is made so it can be placed upon any flat surface to which it is desired to transmit the design. The printing surface may be of wood, metal, celluloid or fabric. The surface, however, must be flat, as it is not practicable to use a silk stencil on round or curved surfaces. Within the frame, at the end nearest to the operator, there is placed a small batch of process paint. The paint differs from ordinary paint in that it is ground finer and is in paste form. It dries flat within two hours.

Using the Stencil

The only tool needed to force paint through the open meshes of silk onto the surface to be printed is a squeegee—a piece of rubber ¼-in. thick, mounted in a wood holder. The operator simply dips up a quantity of paint paste with the squeegee and pulls this over the surface of the stencil; the paint is forced through the open meshes of the silk onto the surface to be printed.

If the design calls for more than one color, a separate stencil

Dependable Finishing Materials

That give the touch of refinement and lasting beauty to well designed furniture.

Amerilac
No. 96 Gloss

Amerilac No. 97
Rubbed Effect

Lacquers

Are used by many prominent manufacturers of fashionable furniture who find an added sales appeal in the luxurious beauty which is imparted by these high-grade finishing materials.

The ease with which Amerilac Lacquers can be applied, and the lower costs obtained because of wider coverage given, and minimum sanding necessary, make them ideal materials to meet present day conditions.

Try Amerilac Nos. 96 and 97, and be convinced. Your Inquiries Solicited.

The American Varnish Co.
1138-1146 N. Branch St., Chicago, Ill.

VARNISHES, STAINS, FILLERS, ENAMELS

SUPERIORITY UNIFORMITY

PYROXYLIN FINISHES, LACQUER ENAMELS

is needed for each color. By means of simple guides, it is possible to "register" accurately.

Any bright boy or girl can soon learn to print with silk stencils. In our own plant one operator averages 300 impressions an hour.

Examples of Furniture Decoration

In practice, as applied to furniture, it might be well to cite an actual problem that confronted the maker of certain novelty furniture. The company specializes on magazine baskets. The management had heard of the silk-screen process and, if practicable, wanted the hand-painted effects obtainable by that process. Accordingly, the manager arranged for an actual demonstration of the use of silk stencils.

The first step was to compose a design suitable for the article. The design chosen from several submitted was a picture of two graceful white swans with a semi-circle background of brilliant orange; the water effect was done in sky blue. The size of the design was 3x6-in. The design was to be painted on flat colors such as tans, cream, white and mahogany.

One hundred and twenty of the baskets were assembled on the floor, with aisles between. An 18-year old girl was given a few minutes instruction and in a short time she was applying the red stencil at the rate of one a minute. By the time she had covered the last of the 120 baskets, the first one was sufficiently dry to receive the blue stencil. When the blue had been applied to the entire lot, the white was put on and the baskets were ready for the spray booth, where the entire surface was given a coat of lacquer.

The result was so effective that a series of designs in from two to four colors were made up for use on the entire line of products.

Use on Other Products

Another concern that makes carpet sweepers decided to place the name of the retail dealer on all sweepers sold. For this purpose individual stencils are made in accordance with copy furnished by the dealer.

For a toy maker stencils were furnished to print the names of the scooters manufactured. For a maker of porch furniture stencils were furnished with which to embellish the fabric backs and cushions of lawn and porch chairs. For an electrical concern stencils were made to print on burnished aluminum surfaces.

Walk into your shop and make particular note of your storage conditions. Ask yourself if a storage rack will enable you to confine your present stock to a smaller space, thus making available for more productive purposes, additional floor space.

Some people have objected to the use of ester gum in clear wood lacquers because they would not take a rubbed finish. If the lacquer is properly formulated, a lacquer made with ester gum can be rubbed to a beautiful luster.

Approximately 11,500 motorbuses were produced last year.

Gold and Aluminum Duco

E. I. duPont de Nemours & Co. announce gold and aluminum Duco for brush application. These two new metallic finishes are peculiarly adapted for use on lamps, mirrors, vases, picture mouldings, book ends, radiators, and for the decoration of furniture. Both finishes are quick drying and have a velvety luster.

"Wears Like Flint"

Permanent Satisfaction

Consistent, year after year permanent satisfaction, from the use of Cleveland Finishes, is the factor that has been the back bone of our constantly growing business.

To understand the reason for this satisfaction it is only necessary to note the results shown in side by side comparisons of our products with those of other manufactures—both in laboratory tests and regular production use.

We specialize particularly in Lacquers; Clear, Rubbed Effect and Colored.

And in Paragon Rubbed Effect Varnishes; Flat, Velvet, and Semi-Bright.

For low initial cost, with high quality finished results, our corps of specialists are at your service.

Your Problems are Our Business

THE CLEVELAND VARNISH CO.

Established 1881

3111 East 87th St. **Cleveland, Ohio, U. S. A.**

"Startling designs seem to have gone by the boards and, as one manufacturer stated, refined suites are more staple. People are learning more about furniture and the finishes, and they demand the most for their money. To satisfy this demand the manufacturer must put on better finish, and this seems to be the trend. Much time is being devoted to better and more attractive finishes and results were clearly in evidence at the recent exposition."

Furniture Designs and Finishes at Jamestown Exhibit

Some high lights observed in the nine stories of new furniture, placed on exhibit for critical inspection of buyers during the first two weeks of May, 1928

By J. A. Williamson

THE SEMI-ANNUAL exposition of the Jamestown Furniture Market Association was held from April 30th to May 12th inclusive, with a large number of buyers in attendance. Interest in the market this year has been well sustained.

No radical style changes were in evidence, but the quality of the work ranks high and is even better in some instances than what has characterized other markets. Several exhibitors introduced innovations that were masterpieces—being mostly hand made—but there was no definite trend to the novel. In case goods there seemed to be no outstanding style, but in many instances a mingling of styles.

The darker finishes were decidedly in the majority and included walnut, mahogany, oak and satinwood trim. These were often inlaid and grooved. Mouldings and carvings are also used effectively in the case goods line. The outstanding suite, to my mind, was a bedroom set made of mahogany, rosewood and amboyna, with marquetry decoration. The marquetry pattern in this suite shows a bowl of flowers overflowing the edge of a vase. Each piece is inlaid by hand and finished natural. The base of the bed is hand carved and shows marquetry decoration.

The predominating woods and colors were walnut and mahogany, much of this being finished in such a way as to bring out the natural striping in the veneer. One beautiful design was finished in the modernistic design, using zebra wood and birdseye maple. The zebra wood was finished in a light walnut color with no shading, but there was an inlay of birdseye maple; the dresser and vanity tops were of birdseye maple finished natural. It was altogether a clever and attractive piece of work. This same design is also available in crotch mahogany.

Bed Room

Walnut, rosewood and mahogany are employed largely in this line, with the tendency toward a

SPRUANCE QUALITY

Here is What a Large Furniture Manufacturer Says:

"WE WERE NEVER ABLE TO GET A SATISFACTORY PIGMENT UNIFORMING STAIN UNTIL WE USED THE 'SPRUANCE QUALITY'."

ARE YOU GETTING SATISFACTORY RESULTS WITH THE UNIFORMING STAIN YOU ARE NOW USING? IF NOT, SEND FOR A SAMPLE AND INSTRUCTIONS. WE WILL GLADLY SEND IT TO YOU FREE OF CHARGE.

AND REMEMBER—

NO MATTER HOW MANY KINDS OF WOOD YOU ARE USING, IF A SPRUANCE QUALITY UNIFORMING STAIN IS APPLIED, YOU WILL GET A UNIFORM COLOR.

"Spruance Quality"
Uniforming Stains
— Made In All Shades —

THE GILBERT SPRUANCE CO.
PHILADELPHIA

"A FINISH FOR EVERY PURPOSE"

dark base merging into lighter tones above. Scroll work and mouldings are employed for decoration, and inlay is used—although not so extensively except in the higher-priced lines. Mahogany is popular with stripes showing through.

Painted numbers were not so much in evidence; the few exhibited were finished in two-tone green, and in cream and gray with gold striping. For ornamentation, floral designs were used in the panel work and the moulding was "worked in."

Dining Room

Here the trend seems to be back to refined suites, with walnut and mahogany largely employed. Tables are either square or oblong and some have a slight curve at the end. Many styles show the four-leg effect and some end in bulb feet. Grooving is used in some styles. A number of tops show burled veneer, while others are moderately plain in one-tone finish. One style called the "Art Moderne" is of zebra wood and mahogany, and is very attractive. Emphasis is being placed on the dinette for city trade, where apartments are small and space is at a premium. These seem to be going good. In this line the table had drop leaves at each end, abbreviating it to about half size.

One innovation is a chestnut suite of silver gray finish, rubbed to show the wood grain. Much comment was aroused on this suite.

Secretaries

In the lacquer-finished secretaries there were three outstanding designs, the Chinese, Floral and Italian. These were ornate and hand decorated. Others included a dark oak blending to light oak, and a mahogany finish with straight graining.

Smokers

Nothing startling new in either design or finish. Some, were lacquered-finished in green; others in red and gold. Mahogany and walnut seemed to vie for predominance. End tables appeared in odd triangular fashions, and the three-in-one set was also on display. These were chiefly in dark finishes and not too ornate. Magazine racks were similar to the smokers in point of finish.

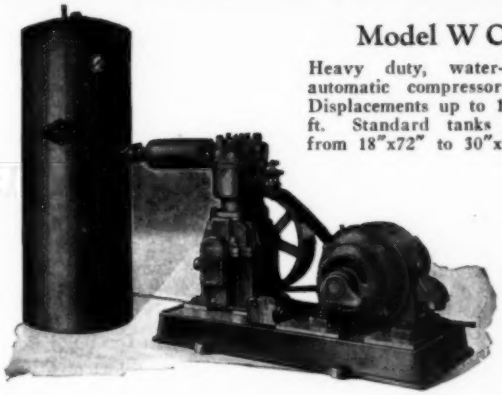
Wicker

Some very startling color combinations were used in the wicker suites. Some were in enamel and others in lacquer finish. Combinations of red with gold trim, red with black trim, green and gold, black and buff, all medium brown and gold and black were in evidence. One outstanding suite was of black and buff. The base was a dull black with buff trim and the modernistic design was employed in cushioning. Canary and black was combined effectively in another design.

Breakfast Sets

A decided innovation was seen in the breakfast-set line. One design features a two-way table whereby the center of the table splits and two sections unite to form an extension of the whole table. These sets come in ten different colors, all of lacquer enamel ranging from canary base to the darker grays and greens. One color effect was of "coral sand" with crackled edges. These sets also come with sideboards to match.

The basic unit of the lacquer spray outfit is the compressor.



Model W C

Heavy duty, water-cooled automatic compressor unit. Displacements up to 124 cu. ft. Standard tanks range from 18″x72″ to 30″x72″.

Invite "Good Luck" into your paint shop

COLORS—smooth, clear, living—*that's* good luck in paint spraying! Whether or not you have "good luck" depends to a very great extent upon your compressed air. A speck of dust, a particle of water or oil, unsteady air pressure may "queer" your work without your ever knowing what the trouble is.

Large factories with big production—small shops with little jobs—all can find the compressor of exactly the right capacity among Quincy's scientifically designed, ruggedly built, air and water cooled models. Will mount up in any way to suit your conditions. Catalogue gladly sent upon request.

QUINCY COMPRESSOR CO.

305 Maine St. Quincy, Ill.

M 30

Finishes for Wood and Metal Refrigerators

Summarizing the various modern finishing materials and methods now used for finishing the interiors and exteriors of ice and iceless refrigerators in wood and metal

By R. L. Masterson

IN FORMER years practically all refrigerators were made of wood and finished in natural oak with varnish, but during recent years the use of white enamel has become more popular as a finishing material. Many manufacturers are now making refrigerators of metal and most of these are finished in white or gray. The various makes of iceless refrigerator boxes also offer an excellent field for the use of white finishes.

Because of the hard usage received by a refrigerator the finishing materials must be thoroughly waterproof, hard and elastic. Furthermore, they must be as nearly odorless as possible—and non-poisonous.

Because of the many methods in vogue for finishing refrigerators, ice boxes and iceless refrigerating machines, I am submitting in this article the various types of finishes and the proper materials to use inside and outside the refrigerators. These recommendations are not arbitrary, however, and some points can be borrowed from one system and fitted into another where it seems advisable.

Metal Interiors and Exteriors

Practically all refrigerator boxes have metal interiors and the system for finishing these with varnish or oil materials is essentially the same, whether the exterior is made of wood or metal. The majority of interiors are made of galvanized iron and, for best results, these should be washed with a chemical solution before applying the first coat, although suitable bond coats are available which give good adhesion to untreated galvanized iron.

Clean for Bond Coat

If the metal is steel, all traces of grease and oil should be removed with a good cleaning compound, naphtha or some similar solvent. When the metal—either galvanized iron or steel—is clean and dry, a bond coat or oil-base primer should be applied thinly and uniformly by spraying. If the brush method is used, turpentine should be employed as a reducer instead of naphtha.

This bond coat may be clear or it may contain pigment to aid the succeeding coats in hiding power. If a small amount of color is present, it aids the operator in seeing any skipped places. Its primary purpose, however, is to give a firm bond to the metal for the succeeding coats.

The bond coat should be air dried overnight before succeeding coats are applied but, where it is necessary to rush the work, it can be coated over in five or six hours. If desired, it can be baked or force dried four hours at 140 or 150-deg. F. It retains a slightly "tacky feel" even when dry and this aids the succeeding coats in sticking tightly to the work. Where baking facilities are available, a baking gray-primer should be used

PENTASOL AND PENT-ACETATE

In the lacquer industry lacquer formulae are subject to many offers of change. It is a great satisfaction to experienced formulators to be able to depend on the absolutely uniform quality and the constant source of supply of Pentasol and Pent-Acetate, and to have such products as standards of comparison by which to judge other solvents.

THE SHARPLES SOLVENTS CORP.

2304 Westmoreland St. - Philadelphia
548B Railway Exchange Bldg. - Chicago
501A Fifth Ave. - - New York City

in place of the bond coat, baking it for one hour at 300-deg.F, or about two hours at 250-deg.F.

Enamel Undercoater

On top of the primer or bond coat, there should be applied one coat of enamel undercoater, which has been reduced to the proper consistency with turpentine or naphtha. For most work the proper amount will be about three parts of undercoat to one part of naphtha. Either air-drying or force-drying undercoaters can be used.

The finishing coat should consist of a gloss or satin-finish enamel reduced to the proper consistency with turpentine or naphtha. Usually a reduction of about five parts of enamel to one part of reducer is about right. The finishing enamel can be obtained to dry with either a gloss or satin finish, in a quality to either air dry in 24 hours or to bake in about 8 hours at 140 or 150-deg.F. These oil enamels for interiors of refrigerators must be of such character and quality as will afford the least possible discoloration with age.

Lacquer Finishes

The quick-drying, absolutely waterproof and very durable qualities of modern lacquers have made these materials especially well suited for use on refrigerators, iceless machines, water coolers and similar products. For some time, however, the use of lacquer enamels on the interiors was questionable because of small traces of reducer which remained in the lacquer film for a considerable period and tainted the food. After much experimental work this fault is said to have been removed from some refrigerator lacquers now on the market.

After 24 hours drying time, milk and butter have been placed in refrigerators finished inside and outside with lacquer enamels and no trace of lacquer odor was imparted to these food products, even after 48 hours. There is a slight odor to the lacquer as it is applied but, if the doors are left off the refrigerator, this odor will entirely disappear from the lacquer film within 24 hours.

Another difficulty formerly experienced with the use of lacquer on galvanized iron surfaces, was lack of adhesion; also chipping characteristics. This is overcome in many factories by using a coat of baked paint primer next to the metal.

Where baking facilities are not available the bond coat, referred to in previous paragraphs, has been found suitable for use under lacquers. This bond coat forms a perfect union with the metal and is not softened or "picked up" by lacquer coats applied over it. The adhesion is remarkable, requiring considerable effort to remove the finish even with a knife or other sharp instrument.

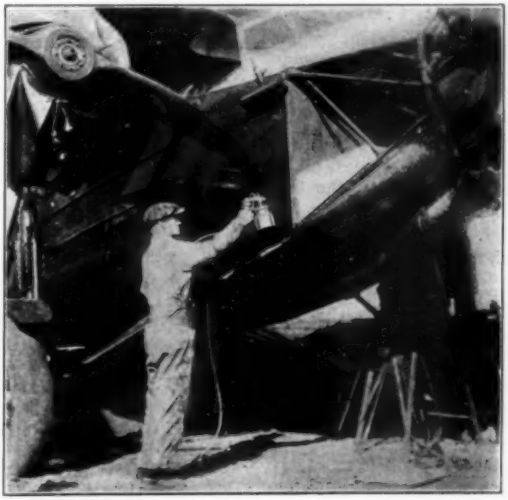
This bond coat, in conjunction with a suitable refrigerator lacquer-enamel, gives a finish so elastic and tenacious that the metal panel can be bent at right angles, even after the finish has been applied several weeks, without any sign of checking, chipping or cracking.

For Lacquer Enamel

Where the refrigerator is to be finished in lacquer enamel, the interior and exterior can be handled exactly the same. Clean the surface free from grease and apply a white bond coat which has been reduced equal parts with naphtha. Let this coat air dry overnight if possible or, in any case, not less than five or six

THE SPRACO 14-A GUN

continues to wing its way to popularity



C—*World Wide Photos*

The above picture taken and copyrighted by the World Wide Photo, and reproduced in the Boston Sunday Post of April 22, shows Commander Byrd's new Polar Plane being sprayed with a SPRACO 14-A Cup Gun.

"Over the desert sand,
Length and breadth of land,
Polar ice and sea,
Like an eagle free
May his good ship fly."

Spraco Painting Equipment Co.

60 High Street, Boston, Mass.

hours. Only a thin, uniform coat of this bond material should be applied. If there are any large indented places, deep scratches or other defects in the metal which would be objectionable in the finished job, these spots can be glazed with glazing putty and allowed to dry five or six hours, then sanded smooth.

Next apply two coats of refrigerator lacquer-enamel which has been reduced at the rate of two parts of enamel to one part of refrigerator lacquer-enamel reducer. The refrigerator lacquer-reducer should contain the minimum odor, and it is essential to use it instead of one of the customary reducers for thinning the lacquer enamel.

Five hours should be allowed between the coats of lacquer enamel, and any dirt nibs should be sanded from the first coat before the next one is applied. Where extra good work is desired, a third coat of the refrigerator lacquer-enamel can be used, although two coats will give a satisfactory finish under most conditions.

No rubbing or polishing of the lacquer-enamel is necessary unless a very smooth, high-gloss finish is wanted. This material flows out well and levels down free from "orange peel" or "pock marks." It dries with a pleasing luster that is sufficiently high for most work.

Natural Wood Exteriors

Oak, ash and elm are customarily used for the exterior of wooden refrigerators, where the finish is to be a transparent, natural wood color. Very few refrigerators are finished in mahogany or walnut, consequently the staining operation can be usually eliminated. Generally, a coat of paste wood-filler is applied directly to the smoothly sanded bare wood and wiped off across the grain of the wood in a manner similar to the method of treating other furniture. Natural and golden-oak shades of filler have been the most popular.

Wood Filler

The filler should be reduced at the rate of 12 or 14-lbs. of filler to a gallon of grease-free naphtha before being applied. For best results the filler should dry 48 hours, especially where lacquer is used for the finishing coats, but many refrigerator manufacturers are apparently getting satisfactory results—under good drying conditions, of course—with only 24 hours drying time for the filler.

Surfacer; Varnish

After the filler is dry, some manufacturers apply a coat of liquid transparent surfacer to further aid the filling of the pores, letting this dry 24 hours, then sanding lightly and finishing with one coat of a waterproof coach varnish. Others use a thin coat of shellac instead of the liquid surfacer and sometimes use two coats of waterproof coach varnish, with 24 hours drying time between coats. For the best grades of refrigerators, one or two coats of waterproof rubbing varnish are applied over the filler—with a day's drying time between the coats—and then rubbed with pumice stone and oil after the last coat has dried 24 to 36 hours.

Lacquer on Wood

When a transparent lacquer finish is specified for the exterior of wooden refrigerators, the procedure to follow is the same as outlined above in regard to filling the wood with paste wood-filler. It is advisable to use an application of bond coat, of a varnish nature,

Good News!

—for every user of shellac

An astonishing new material to mix with shellac, making it far superior to plain shellac on every count —and cheaper to use.

Here is welcome news for every manufacturer now using shellac for finishing wood or metal. Murphy Waterproof Mixing is indeed an astonishing material. When mixed with your shellac you have a material that gives you a very much better finish and at less cost.

Read the facts

Cuts sanding almost in half.
Dries as quickly as shellac.
Builds a fuller finish.
Increased anchorage due to better pore penetration.
Seals as well as shellac.
Increases elasticity of finish.
Greatly increased durability.
Better flowing qualities.
Absolutely waterproof.
Eliminates pinholing.
Does not scratch white.
Prevents shellac turning white.

Many of the great disadvantages of plain shellac are overcome. For instance, with your new mixture, the finish will not turn white. And when the finish is scratched it will not scratch white. The mixture has greater elasticity and stronger anchorage. It will hold on better and build up a fuller finish. There is no "pinholing". Its durability is much greater than that of shellac.

The things that plain shellac does well, the mixture of shellac and Murphy Waterproof Mixing does equally well. It dries as quickly and seals as well as shellac. It is absolutely waterproof.

But it is when you come to study the production figures that you will be most impressed. Sanding —such a large item in your production —costs much less than for shellac. Almost half the cost is saved.

Mix Murphy Waterproof Mixing with equal parts of shellac, down to two parts of shellac —according to the job. It is not a substitute for shellac and should not be used straight.

Get some Murphy Waterproof Mixing into your plant as soon as possible, if you are using shellac in any way. Learn how it will improve your products. Order it now, while you think of it. Or send for further information or ask for a demonstration.

MURPHY VARNISH COMPANY
Newark Chicago
San Francisco Montreal
Essex Varnish Company, Newark
(Associate Company), *Baking Material Specialists*

Murphy *Waterproof* Mixing

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Famous for 63 years among architects, master painters and makers of products requiring a fine finish.

Air-drying and Baking Varnishes
Enamels, Lacquers and Stains for Brushing and Spraying and Dipping

over the bare wood and under the filler to seal the wood against moisture working out of the wood under the lacquer film. Two or more coats of clear wood lacquer should replace the varnish coats, allowing at least five or six hours between coats. This will give a tough, durable finish.

Enameled Wood Exteriors

Where oil enamels are applied to wooden exteriors of refrigerators, it is customary to first fill the pores of the wood with a natural paste wood-filler—if the wood has an open grain such as oak. If the wood is close grained and smooth, this coat of filler can be eliminated. The same undercoats and enamels referred to under metal interiors can be used for wooden exteriors, over the same drying schedules as given there. Often it will be found advisable to use an additional coat of undercoat enamel on wooden exteriors to stop the suction of the wood and to build up a smoother finish. Each coat should be sanded free of dirt nibs before the next one is applied.

Where it is desired to finish wooden refrigerators with lacquer-enamels, the procedure to follow is exactly the same as for finishing metal interiors or exteriors, except that the pores of the wood should first be well filled with paste wood-filler—the same as if the finish were to be brought up with clear varnish or lacquer. After the filler is dry, the bond coat and the coats of refrigerator lacquer-enamel should be applied as previously explained.

Refrigerator Backs

A coat of low-priced brown paint is often used for finishing the backs of wooden refrigerators to give them a neat appearance and to seal the wood to prevent rapid absorption of moisture. Many finish manufacturers have low-priced materials for this purpose—materials that cover solidly in one coat and dry within a few hours. These materials can be brushed or sprayed; for spraying, use a suitable amount of naphtha to reduce them to spraying consistency.

The Sandblasted Finish on Wood

One of the most beautiful and striking of modern wood finishes for panels, doors, or interior decorations in home, club, hotel, or commercial building, is the sandblast finish which is coming into great prominence and popularity in the Pacific Northwest.

Rivaling hand-carved works of art, the sandblasted picture on handsomely grained Douglas fir is the modern work—contemporaneous with the newest era—of the artistic sandblast finisher. This new method of treating lumber for decorative purposes is sometimes utilized in the interiors of fine offices of the modern type.

One of the most recent contracts, that includes this type of decoration is that in the Evergreen Hotel at Vancouver, Wash. This is a community structure reflecting the glory of Northwest Douglas fir on doors of guest rooms, where travelers and tourists, business people and pleasure-seekers may study these works of art at leisure.

Sandblasted Douglas fir paneling gives the doors a distinctive effect. On the panels, the rich grain of the fir, in smooth, gracefully flowing ribbons, have been brought to the surface, to please the eye and to be confirmed by the touch. Each of these panels has had sandblasted in its center the

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silhouette of an evergreen tree from which the hotel takes its name. In the coffee shop of this same hotel, sandblasted panels have been placed overhead.

Developed and perfected by a prominent architect as a unique and striking means of treating vertical grain fir, the sandblasting operation involves first the covering of the panel or interior with a stencil made of rubber. Exposed portions are then subjected

A section of typical sand-blasted decoration on wood.

to a strenuous blasting by sand blown at high pressure against them. The force of this sand, beating against the wood, etches out the softer portions of the surface, and leaves the harder portions standing out in sharp relief, where the outline of the figure or picture appears.

Renaissance scrolls, tapestry or other effects may be sandblasted in Douglas fir and colored for panels, doors, or columns for the interiors of buildings. Western Washington hotels, such as the Emerson Hotel, recently erected at Hoquiam, Wash.—where guests have gone up to touch the posts to assure themselves the surfaces were not tapestry—and the new Evergreen Hotel at Vancouver, Wash., are blazing a pioneer trail of interest in the sandblasted-picture finishes, which represent the most striking ornamentation yet given to the vertical-grain Douglas fir.—C. M. Litteljohn.

What Caused Blistering

A toy manufacturer was having trouble with his finishes blistering. The toys were placed in racks, dipped in dipping tanks, and then hung up high near the ceiling where there was very little circulation of air. As a result of foul air and poor circulation, blistering occurred. It was decided to dip these articles at lower level and hang the racks lower so they would be farther from the ceiling. This change to the zone of better air circulation eliminated the blistering trouble. —C. Joseph.

Thousands of businesses today are not aware of the rapidity with which their methods are becoming out of date.

There is something new and attractive in the beauty and fine artistry of color schemes on the latest automobiles.

It is not safe today to let a machine wear out; nor is it safe to finance on the basis of the expected wearing-out life of the machine.

Five motorcoaches can be operated on regular schedules at the same cost per mile as one passenger train, according to a survey just completed by the A. A. A.

So long as a machine can compete with the best on the market, it deserves a place on the pay-roll, even though it may have been written off to depreciation reserve years ago.

"Experience has furnished most of my knowledge of finishing—together with help from trade papers."—

"Platt"

Comparing Finishes by Practical Tests

Practical finisher foreman cites examples of progress made through the adoption of newer and better finishes, warns about the possibility of sacrificing quality for price and emphasizes the value of making practical tests to determine durability of finishes

By Platt

WE OFTEN hear a lot today about the superiority of a certain line of finishes. For example, a concern is using a certain make of finishing material; then a salesman stops in and convinces the management that his line is better, even proving it perhaps by actual application. The concern now gets its material at a lower cost than before, and the new material covers a greater surface per given quantity.

Some months later another salesman, from another concern, calls. In like manner another change in finishing material is made, and we all agree that the plant is putting out a superior finished product at lower cost. There is no argument against this fact; business competition today demands that a concern lower its manufacturing cost wherever it can and as soon as it can. If it doesn't, it starts down hill and there is a point in the down-hill run where brakes won't hold and so eventually there is a grand smash.

Investigate Quality

Now comes the question:

"Is your product finished so that the final coat, of which you are so proud—the dress-up coat which is the great aid to the salesman in booking orders—is this coat the best one for the goods you turn out, considering that it goes into hundreds of places of business, into thousands of homes, and through the hands of millions of people that use it?"

The laboratories of finish manufacturing concerns are testing and endeavoring to improve their products continually. Why doesn't each plant using finishes test out the finish as to what it will actually go through in the hands of the ultimate owner who (you will please forgive this) is not always a proud possessor, because the finish did not stand the test of actual usage.

Making A Typical Test

Suppose for example, we have an article used both indoors and outside. It is stamped brass, sprayed with bronze powder to give it the "brush brass" or rather "satin brass" finish. The company has tried three different bronzing liquids, found them satisfactory and will order alternately from any of the three, as this material is required.

Now this company decides to find out which of the three is really the best as regards ordinary every-day usefulness. The conditions are:

1—The article will be used indoors.

2—It will be used outside.

3—It will come in contact with hands that may be clean, but which many times will be soiled.

The finished articles for testing are marked with symbols for identification and each one is fastened to an endless chain which passes over pulleys turning about one revolution a minute or faster as desired. Heating coils keep the air at one station hotter than summer heat, and a tub of cracked ice in water duplicates the wet and cold of winter at another station. Wipers, placed on one or both sides of the chain, are made of suitable material and coated with grease, dirt, soot or whatever may come into contact with the finished article during ordinary use. In this way the service of years can be duplicated by a test lasting only a few hours or days.

If it is an article to be shoved in and out of the pocket, test it for frictional wear; if it is to be used in the kitchen, test it for the condition and handling of such; if it is to be handled in the dirt and grease, test it for that.

Finish Service Departments

A firm can send sample articles to the service department of any manufacturer of finishing materials and there, with up-to-date efficient equipment, the best finish for the job will be put on—a finish that will be durable, attractive and a good seller. The service department will submit information on how to manufacture the articles on a production basis, or the service man will come to your plant and, with his own firm's materials, show you the way to produce results. Then, if you wish you can have several other firms do the same thing. Then we will say, you have several satisfactory choices and the only thing left is for your cost department to figure up which offers the greatest economy.

If you are getting material from one firm and everything is satisfactory and you want a special problem solved, why, go ahead and call on the service department of that firm, or another firm if you want to—but *these service departments cost those firms real money and should not be called on for trifling matters.*

Independent Tests

One thing to bear in mind: If you want to test the similar merits of two competitors' products, it's up to your own organization to make the test—or have it done in an independent laboratory. The foreman finisher is in the position management has placed him, and he knows what he is doing; he should know more about finishes than the management. He can run a test like this, because he knows his finishing department and an outsider does not. He knows just what usage the articles will have to stand in daily use.

Why do automobile manufacturers send their cars on long runs? Why do tire makers stress the mileage of their tires unless they know by test? And have you ever heard this? "How many miles to the gallon?"

Within your own shop—with your own equipment and your own men working under everyday conditions—why not find out and know what your product will look like a few years hence? You have a foreman finisher, and this is some-

thing he can do for you. He has the knowledge, and the tests can be made mechanically. Many nationally-known products have to pass strict tests, but many seemingly unimportant products do not. Perhaps that's why the latter remain *unimportant.*

Finishing Wood Turnings

In this article I will discuss some of the difficulties in finishing wood turnings, as this work nearly always presents problems differing in some respects from those involved in other wood finishing jobs.

In the first place remove all grease marks.

Owing to the fact that a great deal of turned work shows up more or less end grain, extraodinary care is necessary in order to obtain an even color of the surface as a whole.

It will not do to put as much stain on the porous parts as on the close-grained or harder portions. If the finisher did this the color would be uneven; the open end-grain portions would be much darker than other parts. The first thing necessary is a very smooth turning, for the final result of any finishing job depends on the condition of the surface before finishing coats are applied.

Nothing but the finest of sandpaper should be used for the last or final smoothing of turned work, and above all else do not apply sandpaper while the wood is turning in the lathe if the article being manufactured ranks as strictly high grade. Do the final polishing with the grain, as far as possible. This is important.

I do not recommend a water stain for turnings, because it will raise a quantity of wood fibers and necessitate a long process of smoothing. My choice of stain for turnings is an oil stain, because oil does not sink into the wood as rapidly as water or spirit stains.

For filling turned work, I prefer pure shellac, and I never apply this while the wood is turning in the lathe. I paint the shellac on with a brush and allow it to dry. Two coats or more are usually necessary to fill the end grain, and these coats should be of thin shellac. After each application of shellac is thoroughly dry, I rub it down with fine sandpaper, but avoid doing this across the grain of the wood.

The shellaced turnings may be varnished or polished with wax, or French-polished. Varnish may be rubbed to a good dull finish with a piece of felt dipped in water and rottenstone, using this while the turning is slowly revolving in the lathe. However, one must take great care not to press hard on the felt or allow it to become dry while doing this. One must also be careful not to rub off the corners. If the finisher uses oil in place of water, he will get a finer finish, but oil is apt to soften the varnish if it is used continuously on one part. When using oil it is best to work rapidly and remove the oil from the varnished surface as soon as a polish has been obtained.—John A. Twamley.

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EDITORIAL

Clean Finishing—Clean Air

Recently the manager of an assembled article made of pressed metal came into our office with a problem in finishing. Part of this article is nickel plated but most of it is a baked finish job, one unit being dark red and another black with a border stripe and centered trade mark in gold. The surface was very smooth and clean but not of brilliant luster.

The manager had an order for a considerable quantity of these articles to be finished like the sample. He was seeking a place where he could get these articles finished.

"Why don't you put them through your own finishing department?" we asked.

"Too much dirt," he announced decisively.

This concern does a lot of very fine lacquer and baked-enamel finishing in its small rented quarters on the eighth floor of a city building but this job, the manager declared, could not be turned out perfectly on account of dust and dirt in the air—from temporarily settled dust from lacquer spraying, sweeping and cleaning, storage of supplies, and general activities within; also small amounts of fine dust, smoke and soot entering from the outside. The particular job under consideration would require practically 100 percent cleanliness to come out satisfactorily.

This problem of clean air is of vital importance wherever there is finishing to do. It represents a combination of problems chief of which is proper ventilation—the exhausting of spent dust and spray and the admission of only clean air. It involves first the construction of practically air-tight finishing rooms with walls and ceiling surfaces that are easily cleaned whatever dust may settle; it requires the use of suitable exhaust fans and corresponding filter-equipped inlets for the admission of clean air.

In this connection it is interesting to note the enormous increase, recently, in the use of air filters in industrial establishments. Some of these air-filtering installations are designed to furnish a complete recirculation system whereby the exhausted air is passed through filters to clean and purify it so it can be used again. One of the outstanding merits of the recirculation system is that during cold weather, the artificially heated air is cleaned and returned to the room with little if any loss of heat, whereas otherwise, we would witness the condition of

heated air being continually released to the outside atmosphere and having to be replaced continually with cold air drawn in through filters and heated before being admitted into the room.

Teaching Color Harmony

From Oakland, Calif. comes the announcement of a Trade Extension Course in Color, given two nights a week at Oakland High School for painters, decorators, finishers and paint manufacturers.

Quoting from the announcement: "The course in color harmony will deal with the basic principles of color blending and color harmony applied in a practical manner to exteriors and interiors of buildings. It will include ample practice and application of the principles involved, and will be given in the nature of practical problems. Members of the class will work individually upon prepared drawings which involve the selection of pleasing color combinations for the exteriors and the interiors of the more common styles of buildings such as the Spanish, English, Norman, Colonial, Italian, etc."

Air Transportation Progress

The fact that air transportation promises to make headway in becoming established on a commercially successful basis is a matter of far-reaching importance, even to many who are now unconcerned about it.

One of the latest air lines to be placed in operation is a de luxe aerial passenger line between Los Angeles and San Francisco. The service started in May with three planes making regular trips between the two California cities, each plane covering the distance in three hours. The fastest trains take better than 12 hours for the same journey.

The Daniel Guggenheim Fund for the promotion of aeronautics designated Western Air Express, of which H. M. Hanshue is president, to establish the model passenger line, because of the remarkable success this aviation company had in handling air mail. It has the record of covering more than 1,000,000 miles of flying without wrecking a plane or loosing an ounce of mail.

For the new passenger line, three triple-motored Fokker monoplanes are being used. These planes are equipped with Wasp motors each of which develops 425-h.p. In test flights the planes developed a speed of better than 150 miles an hour and a cruising speed of 120 miles. Any two motors will provide power to maintain the cruising speed; any one motor will sustain the ship in flight between 80 and 100 miles.

The cabin of each ship has upholstered chairs for 12 passengers in addition to which is provided all the equipment for comfort of the modern Pullman parlor car.

The foreman's job is a tangle. He is a central man in the middle of all the friction.

Census figures show that in 1925 the output of the machinery industry, when corrected for price changes and reduced to a volume basis, was 31 per cent above that of the boom year of 1919.

During the past several years there has been increasing interest in home decoration. This has taken the form of more abundant use of color, a finer taste in decoration, and a better appreciation of the best furniture.

Knowledge is Power

Superintendents & Finishing Foremen:

You are holding your present position because of your *knowledge* regarding the needs and requirements of your manufactured articles.... but how can you *know* that the lacquer you are now using is the best suited to your products and the most economical if you have never tried ours. All we ask is that you test and try

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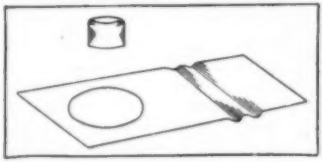

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Questions and Answers

Information Service

Every issue of *Industrial Finishing* contains a wealth of practical information on various subjects of interest to users of finishes and finishing equipment, but from time to time new problems and questions arise, which demand prompt and authentic information. *Industrial Finishing* is in position to service inquiries, and the editor invites all individuals and concerns in the industry to make known their wants. Every effort will be made to supply the information desired, at no cost to you.

Questions are invited in regard to:

Finishing-room troubles or problems;
Where to obtain certain materials, supplies or equipment;
What methods or materials to use for certain results.

Additional comments or suggestions regarding questions, answers or articles appearing in this section, are invited.

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Questions and Answers

Mahogany Finishing Troubles

In the use of genuine African lumber in our product, (office desks) we are somewhat undecided as to the best method to use in preparing lumber before staining with water stain. In the use of mahogany, it seems it is rather difficult to secure a perfectly smooth varnish surface. The wood can be sanded perfectly smooth before applying stain, and even is smooth after a wash coat of shellac has been applied and sanded. It is not until the varnish or lacquer is applied that the pores appear to sink in, leaving the surface rough.

If you can offer us any suggestions as to the best method of treating this African mahogany, which is used for legs, rails and drawer fronts before polishing and staining, we will greatly appreciate hearing from you.—H. D. Co.

African mahogany or Gaboon mahogany has pores that are slightly larger than those of Central American mahogany, and when the lumber is sawed these pores often show up as fine grooves. These are often hard to fill thoroughly with paste wood-filler.

A good system of finishing is to glue size the sanded wood with a weak glue solution of 2 or 4-oz. of animal glue to a gallon of hot water, waiting for the solution to cool before using it. When dry, this glue size holds the raised fibers stiff, so they can be sanded off easily and binds down the fuzz so the water staining does not raise the grain as much as if the glue size were not used.

After the water stain has dried overnight, a very thin or wash coat of shellac should be applied. This shellac solution should be made of about one part of 4-lb. cut shellac to 7 or 8 parts of denatured alcohol. When dry, the surface should be sanded smooth again. If an excessively heavy shellac coat is used, it will fill in the pores too much and prevent the filler from sticking in the pores as well as it should for later rubbing off.

The paste wood-filler should be reduced to a creamy consistency with naphtha, using about 12 or 14 lbs. of filler to a gallon of naphtha. The filler should be rubbed and pounded well into the pores and wiped off carefully across the grain of the wood to prevent it being pulled out of the pores while being wiped off.

Pin-holing in finishes on mahogany is due, to a great extent, to the fact that some of the pores in mahogany wood are connected by U-shaped channels. While one of the pores may be filled with the paste wood-filler, the other may not; as a result, when the finishing material is applied, it runs down into the open pore and forces out the entrapped air, forming a pin hole. To get both openings to such a pore filled it is sometimes advisable to resort to double filling, first using a thin paste wood-filler that will penetrate into the pores, then using a filler of regular consistency.

Recent developments in the lacquer industry have resulted in the perfection of clear first-coat lacquers which are excellent first-coaters for use over the filler on mahogany wood, whether the final finish is to be lacquer or varnish. A good grade of lacquer first-

coater can be sprayed on full-body, will level down smoothly, and dries in 2 or 3 hours to sand. It is claimed that this material will sand easier and smoother than shellac, will be tougher than shellac, will hold up succeeding coats better than shellac and will not cloud the work. The use of such a material over the filler, followed by carefully sanding, should materially reduce your troubles.—Chas. Blanford.

Aluminum Paint for Motion Picture Screen

Lately there seems to be some call for special aluminum powder that can be used for the making of moving picture screens. The regular aluminum will not do, but I am told there is something special for that purpose so that when the picture is thrown on the screen it will reflect perfectly. Perhaps you know what this is and I shall take it as a favor if you will let me have your reply, telling me the kind of aluminum that is used and the kind of liquid.—J. M. L.

The aluminum-finished motion picture screen is usually used when the angle of vision is 15 degrees or less. A smooth surface here is not considered the best, as a rough surface, which is uniform, will diffuse the projected light sufficiently to give the picture more depth and make it appear more realistic.

In applying this aluminum finish good results should be obtained by stretching the screen fabric over a frame and working into the material a size of a heavy-bodied, hard-drying, long-oil varnish. Then apply, preferably by spraying, two coats of aluminum paint, made by mixing in the proportion of two pounds of the proper grade of aluminum bronze powder to one gallon of a hard drying, tung-oil-type spar varnish of the proper consistency.—Edwin S. Woodward.

Alcohol Stain Bleeds; Lacquer Blamed!

This article treats on the value of knowing what lacquer will do when it is used in connection with the wrong materials, when finishing furniture. A friend of mine—foreman finisher of one of our local furniture factories—called me in the other day to see if I could tell him what was causing the bleeding in about 300 small stands he had just finished. These were done in a mahogany; he had given them a coat of spirit stain, then a light coat of shellac which he sanded, following this with a wash coat of lacquer.

The stain had bled badly and he wondered why. It was due to the fact that the stain was dissolved in alcohol and when, followed by a coat of shellac also dissolved in alcohol, the stain bled into the shellac. Then, when he followed

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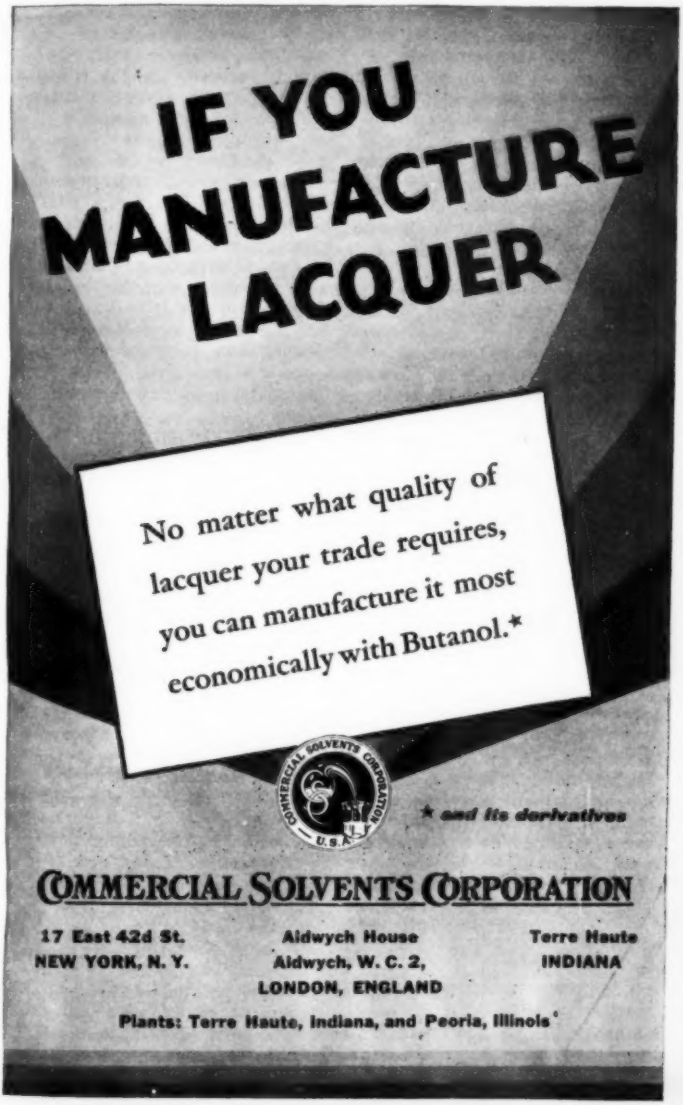
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this with lacquer, the reducer in the lacquer broke down the shellac and bled the stain into the lacquer, so that the job didn't look any more like mahogany than I do. I told him where his trouble lay and how to overcome it.

Now here is where the unfortunate part comes in. He had followed the instructions laid down by the *salesman* who sold his firm the lacquer. It was the first lacquer the firm had ever used, and what a sad result? Now, neither he nor his firm are sold on lacquer; they consider the incident an expensive experiment.

To one who is sold on lacquer, as I am, this is a real catastrophe—and a thing I would like to help overcome.—John Shearer.

Gold Leaf; Gold Sizing for Lacquered Surfaces

Referring to an editorial on the above subject in May issue, page 82, I am accepting the published invitation, and submit herewith a few notes which I believe will be of interest to the followers of this line.

Allow me first of all to make a comparison of gold leaf on lacquer and gold leaf on glass to gold leaf on rubbing varnish.

Before going into details, let us make this test: Apply a bit of sizing to a rubbed varnished surface and allow this to remain for 10 or 15 minutes; then wipe off the sizing with a rag without using turpentine or thinner of any kind. You will note that the spot, where the sizing was wiped off, has been softened to a certain extent by the turpentine or other thinner which is used in the manufacture of varnish and sizes. This softening process causes an amalgamation of the size to the varnished surface, which produces strong adhesion and durability.

After applying the gold leaf and following with a coat of pale finishing varnish, the job will last as long as the varnished surface.

In the case of a regular varnish sizing applied to a lacquered surface, we have two different types of material brought together. The varnish sizing will not soften the lacquered surface, which is hard and tough, and, as a result, it will not cause a binding or amalgamation. Therefore, the size and gold leaf dry on the surface of the lacquer in the form of a very thin sheet, with poor adhesion; this causes a short-lived gold-leaf job, compared to the rubbing-varnished surface job.

We find practically the same case on the local meat-market window, which has been lettered in gold leaf. In this case, of course, there is a different type of size used, but the same principle is employed. This window, however, is lettered on the inside and during the greater part of the winter, the entire window is covered solid with frost; the hot sun gets in its work occasionally, which is a severe test for gold leaf on glass. In this case the size is applied to a hard glazed surface. Although the gold leaf may be backed heavily with varnish, there is still no amalgamation; the weather is such that moisture, in connection with different temperatures gets in its work around the edges, getting under the sized surface and causing the lettering to let go gradually after a short time.

I would suggest, therefore, that the varnish and lacquer manufacturers developed a special sizing to be used over lacquer. This sizing, in my opinion, should be slow drying, and should contain a special thinner or other ingredi-

ents to produce a slight softening of the lacquer, to about the same degree as the sizing used over the rubbed varnished surface—this to give the sizing "a tooth" as it is called.

If this special, slow-drying size for lacquered surfaces could be produced, a special reducer could also be made to be added for shortening the size to suit various conditions. This special sizing could also be used for a preservative coating over the gold leaf.

My experience in this line prompts me to write my opinion on the above. This is a subject of which I would be glad to hear more about, from other readers interested in this line.—C. S.

Why it was made a Brush Finish Job

Every factory executive, who is up-to-date, probably feels a tinge of discontent when his organization has to finish a job by brushing. He feels that he is behind the times—that another executive coming in to look around would brand him as a "back number" because of the slow method of putting on finish.

Circumstances do alter cases, however, and the executive who lays out an iron-clad program, without regard to those circumstances, is as much a back number as the fellow who refuses to consider new things.

An example of how older methods sometimes work out best is found in an eastern factory that makes steel and iron specialties. It seems that practically all of the products go out with a bright finish—either nickel or polished drawn steel; some wire goods are copper tumbled. The exception is a little jack that has a cast-iron body in which a bright steel member slides, and pivoted jaws engage a screw on the sliding member. This jack is painted black by the brush method.

The process of reasoning that settled upon brushing as the best method, is given herewith. I believe is will be of interest to others because, if they do not consider the same factors, they may become entangled in a method that is too expensive for the selling price of the article.

Not Quantity Production

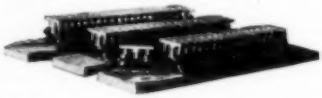
These jacks are not made in vast quantities. About 150 per week are made up, and the work is carried on best by an assembling method that delivers that quantity regularly. At the outset, it will be seen that there is a quantity disadvantage. Notwithstanding that, the spraying enthusiast's fingers fairly itch to turn a gun on these parts. It has not been considered advisable to install equipment just for this job, inasmuch as there are certain disadvantages.

By the hand method, the operator paints around the top, skirting the holes but not getting anything into them. Then, he inserts a sliding member which, thereafter, he uses as a holder during all the rest of the brush work. As the jacks stand in the picture, they rest upon a machined base which must go out perfectly clean. In applying the finish coating, the workman paints to the adjoining edges with his last strokes; be-

Automobile
LACQUERS
Free from gum
Give dependable finish
Established 1857
CHAS. COOPER & CO.
99 Worth St., New York ... Works Newark, N.J.

fore setting the finished jack up to harden, he passes the base over a stiff pad to remove any finish that may have been left.

A black-gloss, meter enamel is used for the work. The parts retain their luster in use quite satisfactorily. The relatively small quantities used lend the air-tight gallon can as the best size and quantity of material to buy; then,



fresh material is always at hand and there is a minimum of outside loss.

If the parts were dipped or sprayed before any machine work had been done on them—which would seem the ideal and speedy way—the finish would be marred in subsequent processes. And if this were done later, working surfaces would have to be cleaned. All things considered, the total time of one minute each is economy that would be hard to beat. —H. A. Donaldson.

Non-Bleeding Red Now Available

In the April issue of INDUSTRIAL FINISHING (page 24) one of your contributors made the statement that the market did not afford a non-bleeding, red lacquer-enamel; we thought you might be interested to know that we have been making such a product in both brushing and spraying lacquers for some little time.

We might add, however, that up to the present moment it has not been possible to make every desired shade of red with non-bleeding pigments. For instance, it is not possible to identically match a para or toluidine red.—The Sherwin-Williams Co.

A Complaint; A Clean-up

One of the complaints recently called to my attention was that the green baking enamel, which one of my customers is using, was dirty and gritty. I decided to trace the trouble myself, so I went to the finishing room where the enamel is used. Here I found the finishing room not very clean. The foreman finisher and I soon got busy cleaning up things. First we cleaned the finishing room then the spraying apparatus. After this thorough cleaning the finished work was as clean as could be desired. The enamel was okey.—J. Cowan.

April construction contracts in the territory east of the Rocky Mountains broke all previous monthly records, according to F. W. Dodge Corporation.

Four small fans located too high along the back wall of this showcase spray booth (for lacquer spraying) were replaced with one large fan installed on a lower level. A vast improvement resulted from this change.

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50 Worth St., New York — Works, Newark, N. J.

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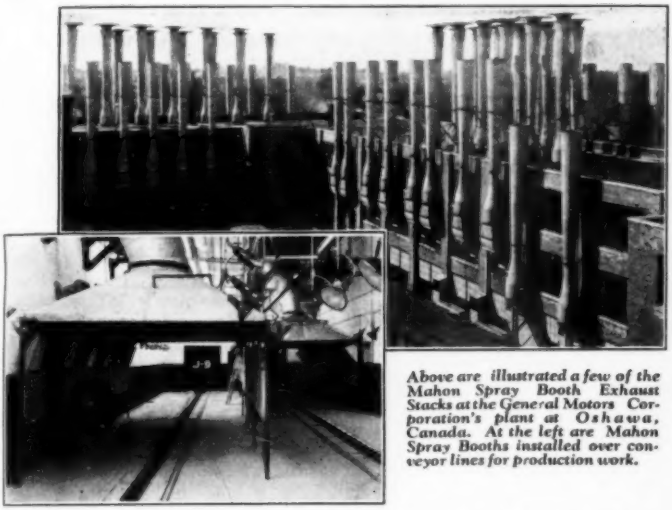

Above are illustrated a few of the Mahon Spray Booth Exhaust Stacks at the General Motors Corporation's plant at Oshawa, Canada. At the left are Mahon Spray Booths installed over conveyor lines for production work.

Mahon Evase Type Exhaust Stacks and Mahon Spray Booths have set a new high standard of efficiency wherever installed. The Mahon exhaust principle, patents pending, exhausts more cubic feet of air per horse power than any other known method, thus increasing operating efficiency and decreasing operating cost. The fan, motor and all moving parts are located outside the exhaust line. Where practical the Mahon designers will locate these units outside the building entirely, offering the most complete precaution against fire. Mahon Spray Booths and Exhaust Systems are designed in close cooperation with plant engineers and are built to fully meet the requirements of the particular job. These installations are models of industrial perfection, aiding the workmen and speeding up production in hundreds of plants where spray painting is an important production operation.

A consultation with Mahon Engineers will cost you nothing

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MAHON

SPRAY BOOTHS & EXHAUST STACKS

DESIGNED FOR FIRE SAFETY

New Materials and Equipment

Presenting briefly, certain outstanding features of new materials and improved equipment which have been developed for use in modern industrial finishing departments

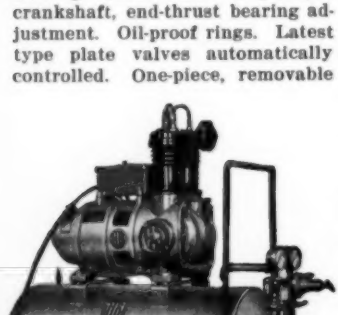
New Portable Paint Spray Outfits

The illustration accompanying this article shows one of the two new portable paint spray outfits recently brought out by the Hobart Brothers Co., Troy, Ohio. Outstanding features, as mentioned by the manufacturer, are as follows:

Motor: Special, ball-bearing compressor type.

Transmission: Silent, spiral, bevel transmission running in oil.

Compressor: Twin cylinder, air cooled; splash lubrication. No oil or grease cups. Automobile type pistons, cylinders, piston pins, connecting rods and drop-forged crankshaft, end-thrust bearing adjustment. Oil-proof rings. Latest type plate valves automatically controlled. One-piece, removable head. Removable cylinders. Compressor bolted to tank mountings with special rubber cushions.



A compact portable spray outf

Tank: Made to conform with all state and municipal codes. Heavy gauge steel plate, rolled by machinery and electrically welded on both sides of seam.

Fittings: Accurate pressure gauge, oil gauge, oil and moisture drains, air filters, safety valves, toggle-joint switch and 25-ft. of rubber-covered cable with attachment plug. Compressor mountings are electrically welded to tank.

Portable: Four metal casters with swivel mountings, and a convenient rigid handle, are electrically welded to the tank.

Outside Installation of Spray Cabinets

The Grand Rapids Blow Pipe and Dust Arrester Co. announces an adaptation of the Newcomb siphon-ventilated, spray cabinet for installation outside finishing rooms.

Quoting from an article on page 94 of March 1927 issue of INDUSTRIAL FINISHING: "This setting of the spray booth beyond the wall line leaves more space available in the room for other purposes, gives more light, is more convenient for the spray operator and for the progress of work from one operation or station to another. Still another advantage—a very important one—is that this arrangement permits the installation of

an automatic fire door which will close the booth in case of fire."

According to the manufacturer, the new installation in no way alters the Newcomb principles of construction. Many installations of the new adaptation—singly and in batteries—are being made where new construction or re-arrangement of finishing rooms make the change possible or economical.

New Air-Driven Grinders and Sanders

The Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, has placed on the market a new line of rotary, air-driven grinders and sanders. These tools are designed along new principles in portable pneumatic tools. The outstanding features claimed for these "Thor" rotary grinders and sanders are the perfectly balanced, vibrationless motor; the governor, the lubricator, and the muffler.

The motor carries four balanced Bakelite blades which are unaffected by oil, water or heat, and is very light. It is mounted on a rigid shaft, suspended in oversize ball bearings. The spindle is also suspended and held in alignment by extra large ball bearings at each end, making a perfectly balanced, frictionless motor. The governor is adjustable, fully inclosed, and cannot get out of order. It keeps the free speed and

Fig. 1—The air-driven grinder with grip-handle throttle.

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CONSIDERING the high quality of our painters' supplies you will find that our prices are low. Let us prove to you that you *can* buy quality supplies at a saving. Send the coupon below for our catalog No. 48.

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Our "Chicago" XXX Varnish Brush is characteristic of Watson values. It is made of selected Chinese Bristles, Nickel Bound, Triple Thick, Very Elastic. Adopted to the finest class of work. Perfect satisfaction guaranteed. Can be used in Shellac, Varnish and Paint.

Width	Length	Per Doz.	Each
1 "	2⅛ "	$2.47	$0.25
1½ "	2⅛ "	3.80	.38
2 "	2⅛ "	5.47	.55
2½ "	2⅛ "	7.53	.75
3 "	3⅛ "	11.20	1.12
3½ "	3¼ "	17.67	1.75
4 "	3¼ "	19.67	1.95

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OUR GUARANTEE
Send for five gallons—If not as we claim, return it.

Jamestown Wood Finishing Co.
Jamestown, N. Y.

air comsumption low, until the wheel is applied to the work and then it automatically throttles to the speed and air required for the job.

The automatic oiler carries sufficient light oil to perfectly lubricate all moving parts for eight hours. The baffle plate muffler, incorporated in a box-like lug on the spindle support, makes the motor quiet and comfortable to handle. It is claimed that these machines will show great savings on any grinding or sanding work on which they are used.

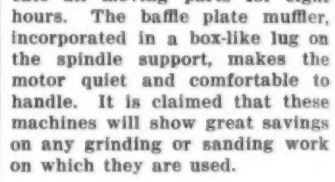

Fig. 2 — The air-driven disc sander for sanding or polishing.

The Thor No. 271 grinder weighs 15½-lbs., is 21¼-in. long and has a straight-handle throttle. Speed is 4000-r. p. m. and air consumption, at no load, 20-cu. ft. at 90-lbs. pressure. This machine is capable of carrying an abrasive or buffing wheel 6-in. in diameter by 1½-in. face.

The Thor No. 271-R has a right-angle housing as shown in Fig. 2. Its length over all is 14-in. and it carries any size flexible disc up to and including 9-in. The speed and air consumption are the same as for the No. 271.

To facilitate the assembly of products, many manufacturers have racks which are taken through the parts department on a lift-truck, and loaded with the units going into an assembly.

New Water Stain Announced

E. T. Stille & Co., 2343 Greenview Ave., Chicago, announces "Stille's Aqua Perma Stain" which, according to the manufacturer, is "just what the name implies—a water stain with a permanent finish."

Information submitted states that this new stain "combines the characteristics of a water and an oil stain, and is fast to light, will not raise the grain of the wood, dries quickly, will not bleed through any finish, has remarkable depth, uniforms the variations of color in the same run of lumber, can have filler applied directly over it without requiring a wash coat of any kind, has deep rich color tone, can be dipped or sprayed with equally good results and requires no sanding."

New Sander and Polisher

Mall Tool Co., 7740 S. Chicago Ave., Chicago, Ill., announces a new electric machine suitable for sanding and polishing in connection with cleaning and smoothing wood and metal to be finished and for polishing finished surfaces.

The ball-bearing angle head to which sanding and polishing discs can be attached, is driven through a flexible shaft connected to a ball-bearing tilting and swiveling motor mounted in a portable stand, as shown in the accompanying illustration.

The new tilting and swiveling feature allows the use of a low motor stand and permits the operator to bring the machine close to his work, giving him unusual convenience and a wide working range. The universal action of this mounting reduces to a minimum the strain in the flexible shaft.

The yoke that makes the tilting

ZELLAC

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Price-Per-Gallon vs Results

WHAT will a lacquer *do*? What is the cost of the finish obtained per piece or per unit? These are the important questions.

Zellac is used by the most successful concerns in your field. Discerning men buy not on "price per gallon" alone—but on a basis of *low costs for the value obtained*. They test for flexibility, adhesiveness, coverage, hiding properties, durability, beauty, and for any other requirements — relation to price per gallon. These men have got not only value and results but also better production and increased salability of the finished product.

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How to Reduce Painting Labor Costs at Least 80%

Milburn Paint and Lacquer Spray Equipment holds World's Record for Speed and Excellence of Work.

9000 Square Feet painted in an hour! The world's record. This was accomplished by one man with a Milburn Paint Spray Gun, using a heavy anti-corrosive paint weighing 17 pounds to the gallon.

In this test the Milburn did the work of five men with brushes. In another instance one man with the Milburn Paint Spray Gun performed the work of EIGHT men with brushes.

One application with the Milburn Spray Gun often covers as well as several coats with the brush. Its atomization is perfect, eliminating "orange-peel" and minimizing sanding and rubbing.

For plant maintenance or production painting, use the Milburn, and paint at a fraction of present costs.

14 exclusive patented features put the Milburn Paint and Lacquer Spray Gun far in the lead. You owe it to yourself to learn more about these features.

Write for Booklet No. 467

THE ALEXANDER MILBURN CO.

1416-1423 W. Baltimore St. Baltimore, Md.

Watch for next month's surprising announcement

action possible offers protection to the motor and serves as a tool holder. If the operator wishes to do stationary buffing, grinding or polishing, the working tools can be held by the tool holder on the yoke.

This is a portable machine in every respect, yet it will deliver a maximum of 1¼-h.p., with only 4-lbs. of weight to be handled by the operator. The machine is powerful but light enough to carry around.

Takes 6 and 9-in. flexible discs for either sanding or polishing.

Electric Flex-Disc Grinder

The accompanying illustration shows the new electrically driven "Van Dorn" disc grinder and sander which, according to the manufacturer, is made for such jobs as removing paint from bodies and fenders, smoothing bodies and fenders after bumping or welding, touching up rust spots, smoothing castings before painting, etc.

This portable machine is powerful, compact in design and is

equipped with a flexible disc—either 6 or 9-in. in diameter—for grinding or polishing. The machine weighs 12 lbs. and its speed at no load is 2400-r. p. m.

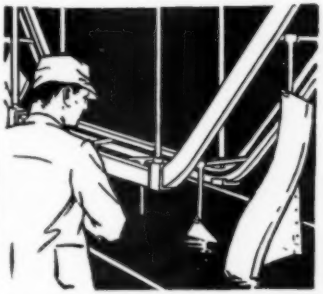
This machine is manufactured by the Van Dorn Electric Tool Co., Cleveland, O.

Subox—New Metallic Coating Material

According to an announcement by Subox, Inc., 50 Worth St., New York City, the material "Subox" is a metallic lead coating which "has all the ease of application of a paint, while at the same time resembling a metalization process in effect." It is based on a pigment of sub-oxide of lead, which by an electro-chemical process, is produced in such a high degree of despersion as to be mainly colloidal. The pigment is held in absolute suspension in a vehicle. Premature oxidation is prevented.

After application, metallic lead is disengaged and settles in a dense mass in and on the surface. A metallic lead coating is gradually formed of unusual adhesion and penetration acting as filler and sealer. The resistance to the elements, to fumes and to moisture, steadily increases until the coat-

blacks
blacks
blacks



BLACK baking enamels for every class of work. Enamels that have toughness, brilliancy and fine leveling properties. Made for dipping or spraying. Intense blacks in high gloss, egg-shell and flat—"purposely made for every purpose".

We maintain a staff of practical and technical men whose services are available at all times to the trade to aid in the solution of finishing problems. There is no charge for this service.

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A product developed to meet the need for a water stain with a permanent finish, combining the characteristics of both water and oil stains.

It will solve your stain problems because:

Fast to light.
Will not raise grain.
Dries quickly.
Will not bleed through.
Has more depth.
Uniforms color variation in same run of lumber.
Filler can be applied directly over it without requiring a wash coat.
Unusually deep rich color tone.
Can be dipped or sprayed with equally good results.
Requires no sanding.

Don't ignore this opportunity to solve your stain problems.

Send for samples of this wonderful new material TODAY, and get full information on our novel proposition.

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ing is finally independent of the vehicle and its limitation. The material does not peel, chip or crack.

A satisfactory protection is furnished against the influences of the elements, chemical fumes and moisture; also against such mechanical wear as wind-driven particles of dust, etc. Subox is dark gray in color and it can be used as a priming coat or top coat. Two applications are sufficient to serve for both priming and ornamental finishing.

Used as primer only, subox results in a very smooth, highly moisture-resistant surface, over which standard lead, zinc and aluminum paints can be readily applied. It is also beneficial as a top coat over primers now in use.

The main requisite for the successful application is exposure to air at least a good part of the time, and a dry, firm and chemically-neutral surface. Over rust, it retards further corrosion to an extent and its adhesion on weathered galvanized surfaces is good. Its service as a binder between galvanized surfaces and ornamental paints is especially valuable.

Subox was invented by a Swiss engineer and is now manufactured in practically every country of Europe.

Seam Putty For Wood

An interesting use of white-lead is its combination with beeswax to make a putty for filling the seams of wooden boats. While this putty was originally developed to seal boat seams and make them water-tight, it has been found equally efficient as a filler of cracks and seams in other wood surfaces.

Yellow beeswax and paste white-lead are used to make the putty. The resulting compound

is of an elastic nature and retains its elasticity, as well as its great sticking qualities, over a long period. Furthermore, there is no waste in making a greater quantity of this white-lead and beeswax putty than is necessary for immediate use. After a lump of it has been laid away in a locker, for example, for two or three years, the putty can be brought back to its original condition simply by rolling the compound between the palms of the hands.

No doubt that fact is the secret of the compound's success as a seam filler. It hardens sufficiently to perform its duty as a seam filler, but does not get so hard as to lose its hold on the sides of the seam through becoming brittle.

The use of beeswax in the seams of boats is not a modern idea. It dates back to Grecian days. Mention is made of its use in several of the writings that have come down to us.

The best method of mixing the white-lead and beeswax is to melt the latter and, when it is almost boiling, to pour the white lead into it, stirring until the whole becomes frothy. Then pour the mixture out on a piece of thick glass or a sheet of metal to cool. When cool enough to take into the hands, the putty should be rolled into a lump.

The proportion of white lead and wax will depend wholly upon the "wetness" of the white lead. White lead that has considerable oil in it will require more wax than will white lead of a smaller oil content. Ordinarily the proportion is four parts of beeswax to five parts of paste white lead.

While the mixture is being boiled, it can be tested by taking out a small quantity and cooling it. One way to do this is to use the tip of a putty knife and to

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If you are looking for a material that is tough, dries fast, requires little sanding and gives a lustrous finish, FINISHEEN will give the desired results. Not an untried product, but one that is being successfully applied on furniture, radio and case goods of all descriptions.

Spray, brush or dip, it gives the effect of a rubbed varnish job at 40% saving in finishing costs.

A working sample will easily demonstrate. May we send it TODAY?

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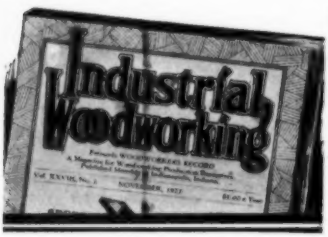

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PRACTICAL PUBLICATIONS, Inc.

801 Wulsin Building
Indianapolis, Indiana

cool under water. If the sample, when cool, can be worked into a seam readily without undue sticking to the knife, the mixture will be correct. On the other hand, if it is stringy, more wax will be needed.

After one has made the putty several times, it is easy to know if the right proportion has been used by the color of the mixture as it boils. If the mixture looks almost as white as did the white lead originally, one can be reasonably sure that too much white lead has been added. If the mixture has a decided yellow color, this is an indication that too much wax has been put in.

As stated before, white lead and beeswax putty possesses good sticking qualities. It is possible to scratch a line in a painted wooden surface and fill it in smoothly with the compound. The putty is excellent for filling in dents. If desired, it can be tinted. The tinting should be done while the mixture is hot.—The Decorator.

Finishing Heavy Machinery with Lacquer

Before I tell you how it's done today, let us go back about five years and look in on a large plant where heavy machinery is manufactured. These machines weigh from approximately one-half ton to as high as four or five tons. They were at one time finished with two coats of slate gray enamel or paint, applied directly on the rough cast-iron surface. This was done by an ordinary house painter who was employed to do the factory upkeep painting.

Today, this plant is running on a fairly smooth system with an occasional slump and boom in business. It has a modern finishing department employing a num-

ber of men who are skilled in their profession, and what closely approaches an automobile finish is being put on this machinery, which has a rough unpolished surface to begin with. This department is equipped with one large and two small spray booths of modern design and construction. The larger booth is where the final coats are sprayed on the assembled machines.

The organization has been working hard and has spent considerable sums of money for a "better finish," which it is still trying hard to improve on. These machines sell for $1,000 to $15,000, and they must have the appearance as well as the performance qualities. There are a number of large, heavy parts that constitute the machine to be finished; these are moved about with electric cranes which place the parts where they can be worked on to good advantage.

First of all, these cast-iron parts come to the finishing department directly from the foundry free from grease, oil and dirt. They are moved into the spray booth one at a time where a pyroxylin primer is applied; after this they are moved out on the floor and arranged so that they may be worked around easily and also picked up again with the crane.

The primer is allowed to dry thoroughly; then, the surfaces are gone over the following day with a pyroxylin putty, the workmen glazing all holes and rough spots, after which the surfaces are allowed to dry. Again the parts are picked up and carried to the spray booth where they receive the first coat of pyroxylin surfacer; this is sprayed on. When dry, these parts are moved to a large bench where iron grilles and a suction system have been installed. On this

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OUR exclusive double process of making gives Du-Pros Shellac an effectiveness that you don't find in other shellacs made of the same materials. Du-Pros is uniform in weight and purity, and exceptionally economical when you consider the service it gives. It produces a more uniformly smooth finish that requires less sanding between coats. Don't forget that Du-Pros is a good filler for close grained woods, a sealer for stain, an excellent body coat, and the best sanding coat known.

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Only **PURE SHELLAC** of the highest quality, both White and Orange, carefully cut in Formula One, 190° Denatured Alcohol, and with ***all*** dirt and foreign matter ***absolutely removed,*** and **GUARANTEED PURE** and **FULL WEIGHT** by the Manufacturers.

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Ferndale (Detroit) Michigan

ARE YOU INTERESTED IN A SLOW BURNING LACQUER?

Our laboratories have perfected a nitro cellulose lacquer that will ignite no quicker than ordinary paint.

This should answer your lacquer problems where the fire hazard is of great concern.

If you are finishing objects where you desire a heat resisting lacquer, we advise you to communicate with us for full particulars and samples.

SAMUEL H. FRENCH & CO.
Paint, Varnish and Lacquer Manufacturers
Philadelphia
Established 1844 Incorporated 1920

bench the sanding takes place, the suction system removing the dust as fast as it is made.

Filling operations are continued until the surface is suitable to receive the finish. At this stage, a sealer is applied and the parts take their necessary course through the machine departments to be machined, after which the entire machine is assembled. After assembly is completed, the painted parts are washed with a gasoline rag to remove the grease and oil from handling; also, any chipped or scratched places are repaired.

Then the polished steel shafting and sliding surfaces on the machine are covered with a thin coating of grease to prevent the lacquer from adhering to these surfaces. Up to this time, the different parts have been undergoing certain operations in the machine department which sometimes cover a period of from two to four months.

After the machine is completely assembled and prepared for the final coats of lacquer, it is moved by crane from the assembly department to the large spray booth where two coats of light-gray lacquer are applied to the previously painted and built-up surfaces. This operation completes the machine for shipping except for the removal of the grease and overspray on the polished steel parts.—C. S.

A period of change is a period of great opportunity for the progressive firm. The first to use an improved method makes a profit, for market prices are still geared to the old methods.

All the facts indicate that a rapid and sweeping change is taking place in industrial equipment.

Controlling Air Conditions To Speed Up Finish Drying

The practice of placing freshly-painted products in a room where there is no ventilation, is not in accordance with the most efficient production procedure. Regardless of the storage capacity available and facilities for letting nature take its course in this respect, the practice is not economical—if for no other reason than its inability to rise to production emergencies.

The installation of a simple forced-air heating system is so inexpensive, in proportion to the results achieved, as to make its consideration a matter of prime importance where any except quick-drying finishes are applied.

Different finishes require different drying periods, but any ordinary paint, varnish, lacquer or enamel will dry much quicker in warm air that is being constantly renewed.

To Shorten Drying Time

Charted curves, based upon actual tests, give a general idea of the average decrease in drying time when ventilated air and air of higher temperature is used.

In general, the charts show the advantage of high temperature and low velocity. High velocities do not seem to offer any appreciable speeding up of the process—which is fortunate in the respect that it permits the installation of inexpensive forced-air ventilating systems and makes possible the conversion of storage places into ideal

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Excerpts from a survey prepared by Midwest Air Filters, Inc., Bradford, Pa., which deals with the application of air filters in connection with heating and ventilating equipment—to obtain faster and cleaner drying of finish coats.

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drying rooms at a minimum of expense.

Of course, the curves shown in the charts do not apply exactly to any particular kind of paint but merely hit an average and indicate the greatly increased evaporation of thinner during the first half of the drying period. The remaining half of the period, while showing no such great difference between still and ventilated air and low and high temperature, nevertheless will indicate a considerable decrease in time.

Baked Enamel Finishes

The charts apply as well to preliminary forced air-drying of baked japans and enamels as to unbaked finishes. The advantages of applying a short, forced, hot air-drying, before placing in baking ovens, is marked—and, of course, the ventilation of baking ovens is not only a matter of saving in time, but a necessity in the elimination of the explosion hazard.

Value of Air Filters

It is obvious that the use of forced air in the drying of freshly-painted products would be impossible were it not that clean, dust-free air, secured by means of modern air filters, is available for this purpose. Air is simply passed through the required number of filter coils and all dust and foreign particles are impinged upon the viscous-coated filter surfaces of same, with the result that only clean air passes into the drying room.

One or more unit heaters, a small blower fan and one or more air filters are all that is required. The cost of power to operate such a fan is low; so also is the cost of a unit heater—and the expense involved in the operation of a mod-

ern air filter amounts to only a few cents per week.

Manually-cleaned unit filters are satisfactory and economical for this purpose. It is only necessary to dip them in "viscosine" once a month or so, to clean and recharge them for further use. Where finishing is done on a large scale, one of the automatic self-cleaning filters may better answer the purpose.

In some factories, freshly-finished products are hung up or left to dry in rooms where men are at work, in which case it is undesirable to supply air at high temperatures. But the advantages of ventilated air of ordinary temperatures, are well worth while in speeding up the drying process. —Ria Sretlif.

To Eliminate Explosion Hazard in Baking Ovens

Japanning or enameling ovens constitute an exceedingly serious explosion hazard when evaporated thinner vapors are allowed to accumulate at the high temperatures maintained in these ovens. It is estimated that a mixture of approximately 1½ percent by volume of thinner vapor in air will explode.

One of the simplest methods of getting around this difficulty—and the one generally used—is to get rid of the explosive vapors by ventilating the ovens during the baking process.

Naturally such ventilating air, unless it is cleaned of all dust particles, may constitute a serious menace to the quality of the finished product. The U. S. Weather Bureau estimates that there are 115,000 particles of dirt to the cubic inch of ordinary city air. The circulation of 300 to 400-cu. ft. of air per minute through an aver-

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age baking oven, under ordinary circumstances is capable of depositing appreciable quantities of dust upon the sticky japan or enameled surfaces.

The use of screens in air-intakes is sometimes resorted to, but the majority of these screens are of questionable efficiency; they are likely to be a source of trouble and clog up, thus building up a resistance which increases the danger of an insufficient air supply. Properly designed air filters require little attention and provide a steady stream of clean, dust-free air at all times.

Most of the thinner vapor is given off during the first 10 or 15 minutes of baking. For this reason, it is advisable to let freshly-finished products stand for a few moments before placing in the oven, in order that as much enamel and thinner vapor may be removed as possible before the charge enters the oven.

Sufficient air must be supplied during the first few minutes of baking to prevent the forming of an explosive mixture. At this time, a great quantity of air is needed, although very little is necessary towards the end of the bake. Fifty or more changes per hour are often necessary at the beginning, yet 20 changes are more than enough at the end.

Editor's Note: The above article is made up of excerpts from a survey prepared by Midwest Air Filters, Inc., Bradford, Pa.

Getting the stroke! That is as important in striping as it is in baseball, golf or tennis.

The increasing popularity of the lift-truck system means that more and more stock is being permanently stored on lift-truck platforms.

Important Features in The Bake-Finishing Process

A practical discussion of baking ovens and methods of operating them, with special emphasis in regard to uniformity of oven heat, correct temperatures for baking, adequate ventilation, cleanliness, and the proper conditioning of articles and materials to be finished

By C. Dan Youngs

ALTHOUGH there are several ways of applying finishes that are to be baked, there is only one way to bake them, and that is at the correct temperature and for the correct length of time. This varies, of course, with the type of article to be finished and the color of finish required. A wooden article, for example, cannot stand as high a heat as can one of metal, and a white or light color cannot be baked at as high temperatures as the blacks and darker colors.

For this reason great care must be exercised in the actual process of baking. The required time and heat must be known in advance and must be carefully watched. Too low a heat will render the finish soft, while too high a heat will make it brittle and even turn some blacks to a gray color. A happy medium must be found which only experience and practice can determine.

The three principal types of ovens in use today are gas, electric, and—to a smaller degree—fuel oil. Gas ovens are the most common, but during the past few years electric ovens have made such rapid strides that it seems possible that they may in time supplant all other types. Better heat control and cleaner operation are claimed for the electric ovens, in comparison to ovens heated directly by gas.

Two Types of Gas Ovens

Gas ovens are divided broadly into two types designated as direct and indirect-heat ovens. The direct heat ovens are largely a survival of the first crude efforts in making bake ovens and, owing to the nature of the combustion, they do not give as even a distribution of heat as indirect-heat ovens. Where high heats are required, the air that must be drawn in to effect combustion is apt to carry dust particles which will eventually settle and speck the finish. The incoming air will also affect the ventilation, and this must be taken into consideration.

In the indirectly fired gas oven, the heating method is entirely different, being that of radiation. Heating chambers, and the parts actually used in baking are entirely separate; the burners are enclosed in a small space, and there is no excess air to be heated before the baking heat is reached. While a large number of direct-heat gas ovens are still in use, the advantages of the indirect method over the direct will, I believe, ultimately do away with the direct-heat ovens, excepting in certain places where conditions are such as to favor their employment.

Electric Ovens

Progress in electric-oven design and construction has made giant

strides within the past few years. Because of the type of fuel employed it is claimed that better control of heat is possible; in fact, I understand that patents, taken out by some oven manufacturers, show that an absolute control is possible. Some ovens have a thermostatic device by which the heat can be held at any pre-determined temperature; the heat is automatically cut off when this temperature is reached. Another good feature of electric ovens is the absence of any open flame which might ignite inflammable vapors, thus affording safety from danger of fires or explosions.

Results Are What Count

Naturally, there is a wide difference of opinion between manufacturers of gas and electric ovens regarding the merits of their equipment but, eliminating the directly-heated gas oven from consideration, there is really not a great deal of difference in actual performance, so far as the results obtained. A worker's familiarity with only one type of oven will tend to strengthen his belief that the type he uses is the better. However, as a matter of fact, the method of heating is immaterial, so long as an even distribution of heat of the required temperature is secured.

No oven yet made will show the same thermometer readings at the bottom as at the mid-height or top. Yet modern manufacturers today have evolved ovens which come about as near to equalizing heat distribution as it is possible to make them. The difference in temperature must be watched closely however, since if a too wide variance is present, some of the finished articles will be properly baked, while the remainder, where the temperature is different, will be either over-baked or insufficiently baked.

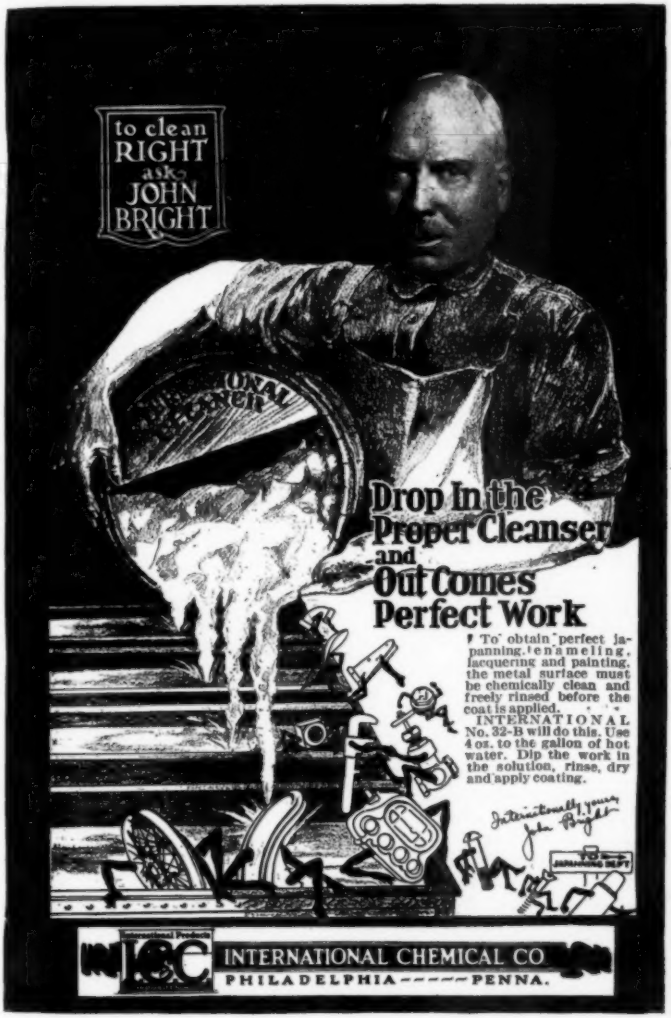
Temperature Control

This brings up another point. No baking of finishes can be properly accomplished without temperature control. A man may believe he can guess the temperature of an oven closely enough—and this may be true in some cases not requiring certain absolute degrees of heat—but it is hard to understand why anyone should operate without a thermometer when an instrument for outside reading can be purchased for anywhere from $3.00 to $30.00.

A thermometer is of little value if it must be placed inside the oven in such a way that the doors have to be opened to read it. Thermometers are made so that the bulb gets the heat from the inside and the reading is visible from the outside; there is no necessity of opening the oven doors and permitting any cooling of the interior. Perfect heat control cannot be obtained without a thermometer.

In some factories—where a variety of finishing is done with quite a difference in temperature and baking time—a chart is placed near the oven, and on it each run is written up showing the time placed in the oven, the time it should be taken out, and the maximum temperature for the job. The foreman of the department checks up on this chart and in this way he has perfect control of baking operations for each oven. A suggested form for such chart might be headed:

1 Name or number of article;
2 Time put in oven;
3 Time taken from oven;
4 Thermometer reading on entry;
5 Reading on withdrawal;
6 Maximum heat.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